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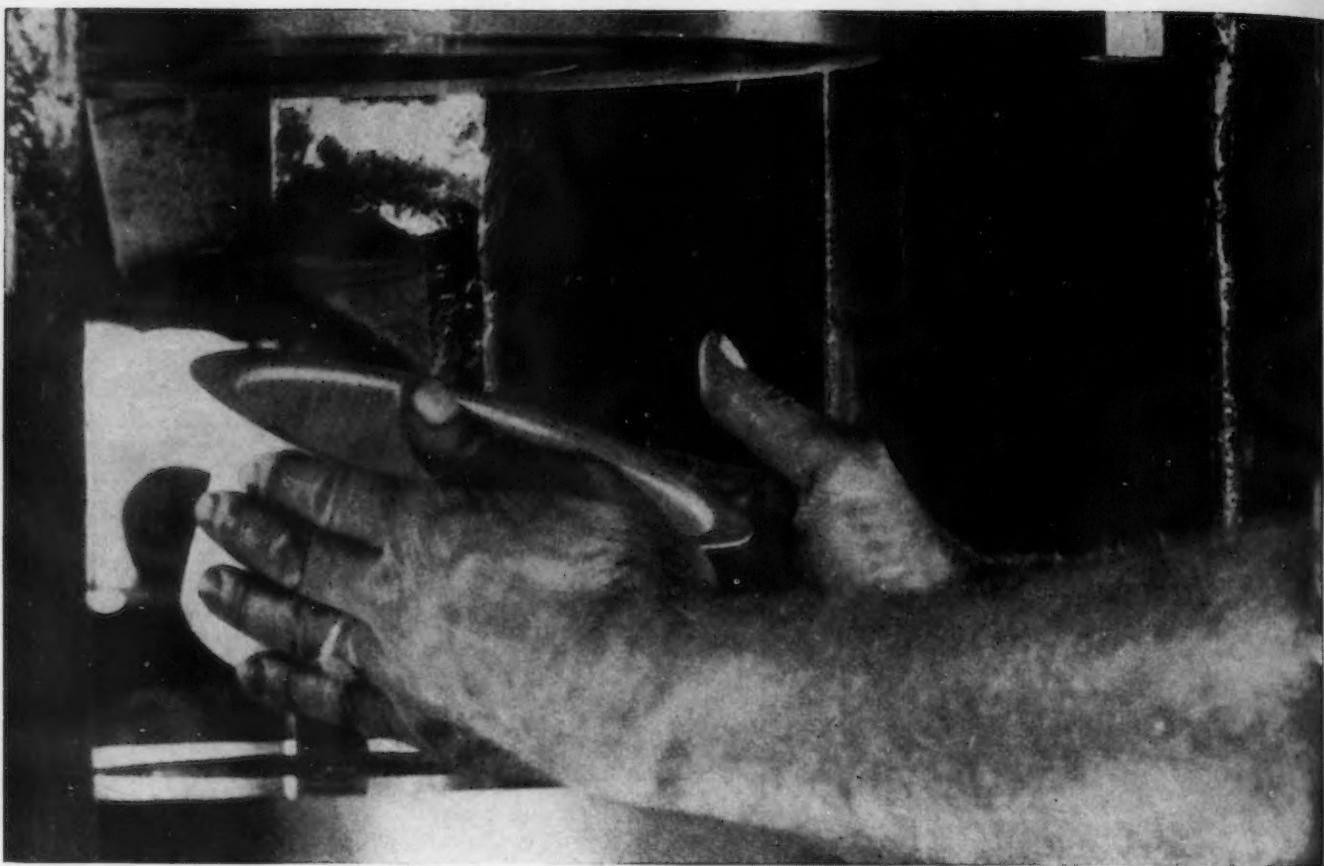


# THE IRON AGE

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# ... THE IRON AGE ...

ESTABLISHED 1855

AUGUST 3, 1939

Vol. 144, No. 5

## A LOT OF SWEAT

**A**MERICAN Federation of Investors, Chicago, has just completed a study of taxes paid during 1938 by 163 representative American corporations. It presents some interesting findings about other things as well as taxes.

For example, these companies have more than  $6\frac{1}{2}$  million stockholders, as compared with some 2.8 million employees. Stockholders, therefore, outnumber employees more than two to one. Average number of shares held per stockholder is 104, and more than three-quarters of the stockholders have not more than 100 shares each.

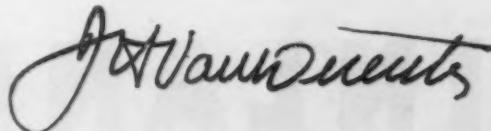
Two thoughts spring automatically from the above findings. One is that the owners of our great American industries are not plutocrats but are people of comparatively modest means. The other thought is that, if labor is entitled to a voice in public affairs in proportion to its numerical strength, stockholders might justly claim to be heard on the same grounds.

Taxes paid by these 163 corporations, according to the Federation, amounted to an average of \$2.73 per share of common stock, whereas the average dividend paid per share amounted to \$1.33 or less than one-half as much. This, in turn, gives rise to a thought as to why investment of private funds has been so reduced in volume during the past nine years. Prospective investors must face the fact that the tax collector who does the taking out will benefit from profits twice as much as the investor who does the putting in.

By calculating the tax bill paid by these companies on the payroll basis, it was found that it amounted to an average of \$576 per wage earner. This in turn gives rise to a vision of an invisible man standing back of every three workers and exacting a full year's pay of \$1728 from their pay envelopes.

The invisible man, of course, is the government employee whose wages are paid in taxes. And taxes, as Mr. Roosevelt so aptly said when Governor of New York State, "are paid by the sweat of every man who labors".

There is a lot of sweat in a thousand million dollars. And, roughly, this was the 1938 tax bill of the 163 concerns surveyed.





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# DROP FORGING STAINLESS ALLOYS

By R. W. THOMPSON

*Sales Engineer, Transue & Williams  
Steel Forging Corp.*

THE production of drop forgings from stainless alloys, or those alloys which might more suitably be termed corrosion and heat resisting metals, is no longer considered as presenting a difficult forging problem in the plants having all operations under the supervision of a competent metallurgical staff. It is quite true that the manufacture of drop forgings from these alloys represents a specialized field in the forging industry, where experience and sound knowledge of metallurgical principles and an unusual degree of skill are each of considerably more than average importance.

Due to the greater toughness of these metals within their forging temperature ranges, their closer limits of forging reduction, their greater resistance to flow in the dies, and their reaction to cold working, punching and trimming, a number of problems are encountered which do not present themselves in the fabrication of the ordinary alloys and carbon steels. The effect of the rate of cooling, together with the correct principles of heat treatment necessary to produce desired physical properties and corrosion resistance, are characteristics under-

stood only by the technically trained engineer.

The ability of the drop forger to improve the physical properties of these corrosion resisting alloys through proper working refinement has increased the demand for this class of product tremendously. These forgings, because of their ability to resist corrosion and withstand high temperatures and pressures, have enlarged the field of forging application.

The valve industry has found the use of forgings from these alloys indispensable in meeting the demands of the trade for valves to give guaranteed service in such industries as refineries, power plants and paper mills. Pressure governors and regulators, pump shafts, pistons, airplane motor starters, welding and cutting torch heads and numerous items of marine equipment have unusual records attesting to the advantages of these newer metals. Their stainless qualities have also developed many forging parts for use in the food, dairy and packing industries where the safeguard of public health is of national importance.

Stainless steel is not a single alloy, but rather an entire family of alloys, of which there are three main branches or groups: The martensitic steels, the ferritic steels, and austenitic steels.

The martensitic steels composed mainly of chromium, iron and carbon,

are magnetic, and can be hardened and tempered by heat treatment in much the same manner as ordinary steels, excepting that they will harden intensely when cooled in air from the higher temperatures. The most common steel in this class used in drop forging is identified as type No. 410 and contains 0.12 per cent maximum carbon with a chromium range of 10 to 13½ per cent. This analysis is sometimes modified by the addition of columbium, aluminum or molybdenum for specific purposes.

The ferritic steels, which have a chromium content of 16 per cent and over with carbon under 0.15 per cent, are not hardenable by heat treatment and therefore are only annealed for purposes of machineability or to secure better corrosion resistance. In this condition forgings in this steel are relatively strong and have good ductility and are used where extreme hardness is not necessary and more corrosion resistance desired than can be secured in the martensitic types.

In the third group or austenitic type, composed chiefly of chromium, nickel and iron, the predominating forging type most commonly specified is No. 304, or 18 per cent chromium, 8 per cent nickel, with a maximum carbon content of 0.08 per cent. Two other much used types in this classification are No. 302 and 303. The former is

the same as type 304 with the exception that the carbon range is 0.08 to 0.20 per cent and the latter, which is known as a free machining grade, is usually alloyed with small percentages of molybdenum, selenium, zirconium, copper or sulphur. Also worthy of mention in this group are the reverse 18-8 alloys, those with 20 per cent nickel and 8 per cent chromium, due to the demand for forgings in this steel by the chemical industries. This analysis, classified as type No. 325, is used both with and without the addition of copper. These steels are non-magnetic and cannot be hardened by heat treatment, although considerable hardness is possible by cold working. In the annealed condition they are relatively stiff but extremely ductile.

In the corrosion resisting family of

resisting qualities. Brinell hardness values of 286 on drop forgings of "K" Monel and 340 in "Z" nickel with a good depth of penetration are possible after proper heat treatment. With some work hardening these limits can readily be increased to 321 and 375 Brinell respectively provided the proper temper material is used.

These alloys are readily forgeable and practically any forging design produced from ordinary steel can successfully be made of these metals if the necessary precautions and knowledge of correct heating procedure and temperature ranges are observed.

#### Wastage Must Be Low

Drop forgings in the steels and alloys briefly outlined in the foregoing, if manufactured at a profit, must be carefully supervised during all opera-

ing, but are found to work best when charged directly into the furnace maintained at a temperature of 2100 deg. to 2200 deg. F. The steel should be heated quickly and forging operations begun just as soon as the steel is heated throughout. The 20 per cent nickel-8 per cent chrome type is usually forged at a little lower temperature, generally beginning at about 2100 deg. F.

The heating operations prior to forging Monel metal, "K" Monel and "Z" nickel are somewhat more critical than those for the aforementioned stainless steels. Care must be taken to avoid the metal being exposed to sulphurous heating atmospheres or other sources of sulphur, and it should be charged into a hot furnace in which a reducing atmosphere is maintained. The furnace may be operated at 2200 deg. to 2250 deg. F. but the bars must be removed while their temperature is still rising, usually when they reach 2000 deg. to 2175 deg. F.

On account of the increased strength and stiffness of the corrosion resisting alloys at forging temperatures, about 25 per cent more blows and in some cases larger equipment is necessary than for producing the same part of ordinary steel. Inasmuch as this stiffness increases as the temperature drops, it is often necessary to reheat and again bring the metal up rapidly to the forging temperature for completion of the part. The first few blows of the hammer should be light so as to start the metal flowing and minimize the danger of rupture or splitting.

Dies should be designed so that the metal is placed as nearly as possible in the blocking impressions so as to match the contour of the finishing impression to avoid incompletely filled forgings as well as checks and cold shuts. These metals cannot be forced out as easily into the flash gutters of the dies as the carbon steels and therefore great care must be taken to relieve crowding by punching out centers as in ring blanks and relieving the metal wherever possible in other forging designs.

The limit of effective deformation for the straight chromium steels may be considered to be 1650 deg. F., excepting the 16 to 20 per cent chromium irons which should be worked to about 1400 deg. F. for the proper grain refinement.

The forging reduction of the chromium nickel steels may be conducted until the steel cools to about 1750 deg. F. before reheating, unless high physical properties are desired. If forging is continued below this temperature

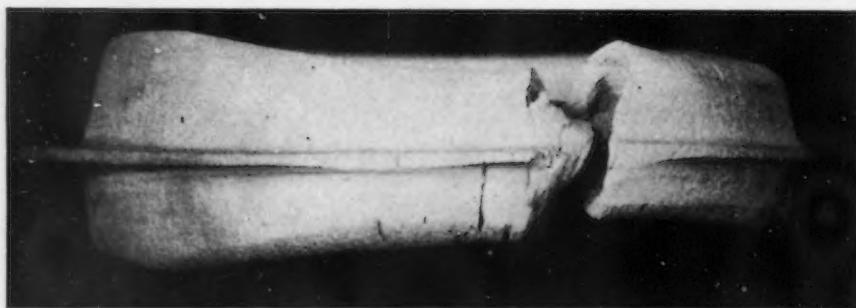


FIG. 1—Partially completed hammer-upset forging which has ruptured.

metals considerable attention should also be given the high nickel alloys of which Monel metal, "K" Monel, and "Z" nickel have developed a particularly increasing demand in their use in forging parts. Monel metal which is a non-ferrous nickel-copper alloy has been used for drop forgings for a long time and due to its success in diversified applications the newer types, "K" Monel and "Z" nickel which are capable of heat treatment, have been developed to increase their scope by combining corrosion resistance with greater strength and wear resistance.

"K" Monel and "Z" nickel like Monel will harden by mechanical working, and therefore this feature is sometimes taken advantage of by combining a certain amount of work hardening with thermal treatment to secure exceptional hardness values. The selection of either of these metals should be based mainly on the mechanical requirements necessary for the particular application, inasmuch as they have the same general corrosion

tions. Due to the higher cost of these metals, wastage in excess flash and excessive scrap loss must be eliminated. To secure economies in this phase of production as well as to insure the advantages of the inherent qualities of the metal, the bars or billets should be heated in an automatically controlled semi-muffle furnace.

The straight-chromium stainless steels in bar sizes larger than 1 in. in diameter should be preheated at 1500 deg. to 1600 deg. F., allowing ample time to insure thorough heating throughout, and then transferred to a high temperature furnace maintained at 2150 deg. to 2200 deg. F. Forging should begin just as soon as the steel reaches the furnace temperature. The above temperatures are reduced for the higher carbon steels. Excessive temperature and prolonged heating at high temperatures produce grain growth which is likely to cause a rupture in the steel during forging.

The chromium-nickel steels, 18-8 types, in bar or billet sizes used for drop forging do not require preheat-

the reduction should be small so as to avoid rupturing the part.

Forging operations on Monel, "K" Monel and "Z" nickel should be discontinued when the metal has dropped to between 1700 deg. and 1850 deg. F. depending upon the type and the design being forged. It may be said that the temperatures detrimental to these alloys are considerably below those necessary to promote good die life and very seldom would forging reduction be attempted at these minimum temperatures.

In trimming the flashings from drop forgings of stainless alloys attention should be given the temperature at which this operation takes place and likewise the amount of semi-cold working to which the forgings have been subjected. Generally for production quantities the decision as to whether hot or cold trimming should be used is dependent upon the size and design of the forging. However, if cold trimmed, an annealing operation should be given beforehand.

The straight-chromium steels with air hardening characteristics if trimmed hot should be conducted at a temperature of 1750 deg. to 1800 deg. F., because if permitted to cool much lower they pass into the critical range and hardening will take place. Occasionally forgings of certain shapes will tear open at the flash line when hot trimmed. This condition can usually be remedied by permitting the forging to cool slightly, which causes the flashing to harden enough to give more shearing effect to the steel.

#### Edged With Stellite

In the austenitic nickel-chromium steels conditions of this nature are not encountered and no difficulties in trimming occur unless the forgings have been subjected to excessive cold working.

To give satisfactory service life the trimming dies, punches and broaches should be edged with stellite, as the wear on these tools, particularly the punches and broaches, makes it difficult to maintain a good cutting edge.

Due to the fact that a large number of the applications for these alloys require the development of high physical properties for complete success in service, grain fibers of unbroken continuity in the forgings are essential. Since stainless steels have directional properties the same as common steels, any grain flow condition can also be duplicated in these types.

The microstructure of stainless steel bars for drop forging is particularly important if the forging operations

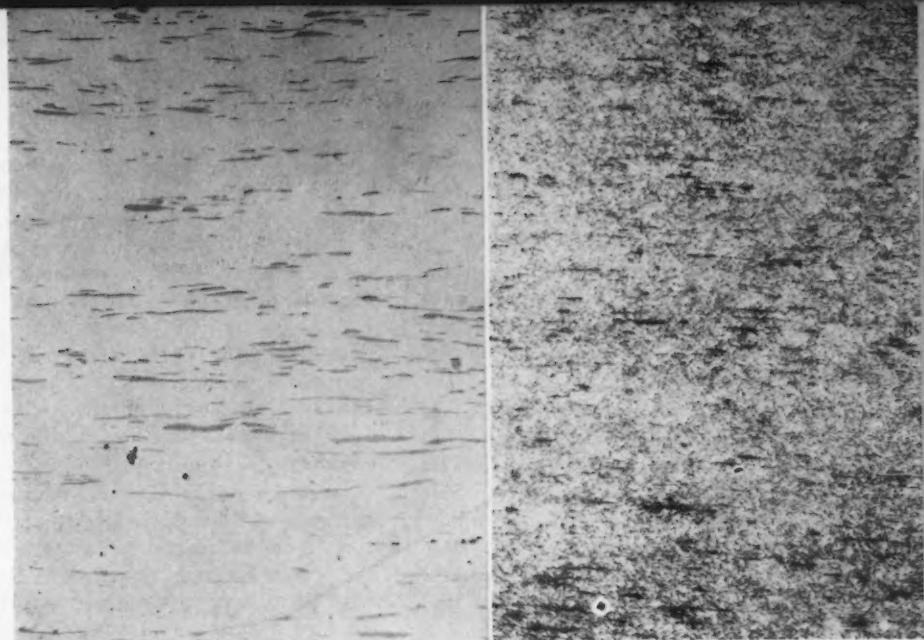


FIG. 2—(Left) Unetched steel showing the unsatisfactory distribution of sulphides which results in poor ductility; (right), the same steel etched with glyceregia. Both photos are at 100 diameters.

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are of an upset nature. Forging bars that are to be subjected to severe deformation such as header or hammer upset operations require steel with an exceptionally good surface finish and with chemical elements in the proper proportion. The value of this cannot be over-emphasized if the forging bars are of the free-machining type, as demonstrated in the accompanying photographs.

Fig. 1 shows a partially completed hammer-upset forging which ruptured due to an improper ratio of carbon, sulphur and chromium combined with the distribution of sulphide inclusions.

The photomicrograph, left, in Fig.

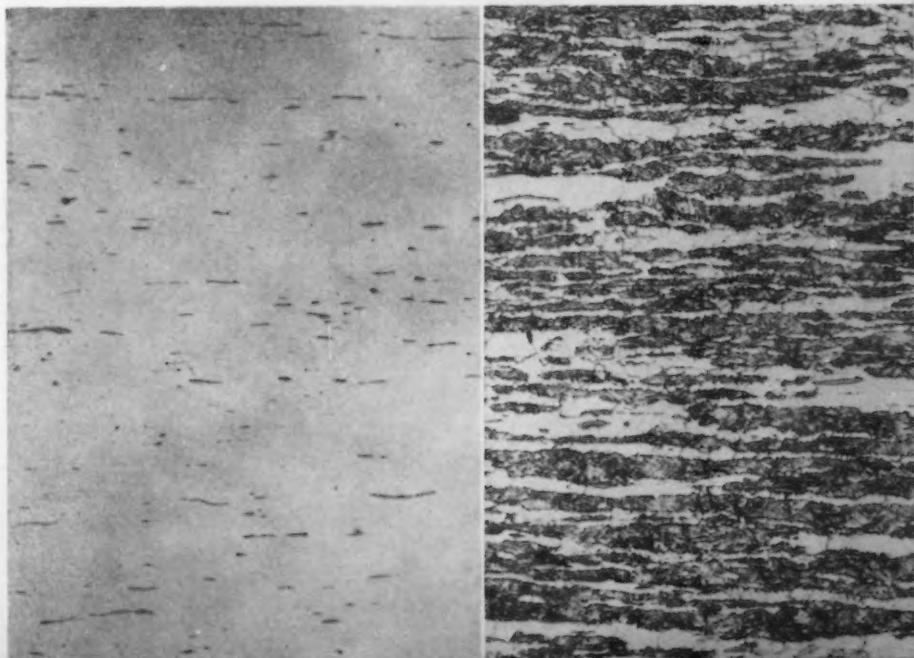
2, shows the amount and distribution of the sulphide inclusions in this steel which, in conjunction with its analysis, provided insufficient ductility to withstand the upsetting operation.

Fig. 2 (right) shows this same steel etched with glyceregia. That there is very little free ferrite is apparent in contrast with the illustration to the right in Fig. 3. The appreciable differences in microstructure between this heat and one which forged satisfactorily can be understood by a comparison with the photomicrographs in Fig. 3.

The chemical variation in the two heats, which is largely responsible for

FIG. 3—(Left) Unetched steel showing a sulphide distribution permitting successful upsetting; (right), the same steel etched with glyceregia. Both photos are shown at 100 diameters.

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their structural difference, is shown by comparing the unsatisfactory heat which has a carbon content of 0.12, Mn 0.50, P 0.018, S 0.28, Si 0.43, Cr 12.70 and Mo 0.50 per cent with the forgeable heat, shown in Fig. 3, having a carbon content of 0.075, Mn 0.35, P 0.014, S 0.16, Si 0.32, Cr 13.33 and Mo 0.54 per cent.

If stainless steels of this nature are to withstand the severe stresses to which they are subjected as in upsetting operations, their chemistry must be controlled with carbon and sulphur not over 0.10 per cent and 0.20 per cent respectively and the chromium content to the upper limits of the specification.

In order to secure the best results after heat treating, both in respect to Brinell hardness and corrosion resistance, the martensitic straight-chromium steels should contain a specified amount of carbon and chromium. By so doing the higher hardness values can be obtained if necessary, and drawing temperatures avoided which decrease the ability of the steel to resist corrosion. Tempering or drawing heats in the neighborhood of 900 deg. to 1100 deg. F. lower the impact values and lessen the resistance to corrosion.

A combination of 12 per cent chromium and 0.10 per cent carbon will harden to approximately 360 Brinell after oil quenching, and with a carbon of 0.35 per cent, it is not uncommon to obtain a hardness of over 500 Brinell. As the chromium content increases, the effectiveness of the carbon in hardening diminishes. Tensile strengths of as high as 200,000 lb. per sq. in. are possible in these steels after heat treatment.

Drop forgings in the nickel-chromium austenitic steels can be annealed to maximum softness by air cooling or quenching from temperatures above 1900 deg. F. They are readily machineable after this treatment, and the treatment produces a Brinell hardness of 135 to 179.

Monel metal is not responsive to

thermal treatment for the development of hardness. It is annealed for the purpose of a further continuance of cold working or to facilitate other operations which may be required subsequent to forging. Either open or box annealing may be used. The temperatures for open annealing are between 1650 deg. and 1800 deg. F., and for box annealing the range of 1350 deg. to 1450 deg. F. is most satisfactory.

In order to secure the maximum hardness in "K" Monel forgings, the forging work should be continued to the lower forging temperature limits with light blows, after which a further working of the metal is again necessary at 1200 deg. F. The amount of working at this temperature is the basis for the final hardness results after the thermal treatment. Forgings which have a Brinell of 241 after this working can be treated to a Brinell of 321 by soaking for 14 to 16 hr. at a temperature of 1100 deg. F., followed by a furnace cooling at the rate of about 15 deg. F. per hr. In following this procedure the machining operations would be conducted after the working treatment and before the aging operation.

As stated heretofore, "Z" nickel properly hardened and supplemented by cold working will produce unusually high physical properties with very good hardness values for a metal with such exceptional corrosive resistance. In order to accomplish sufficient cold working to assist in securing maximum hardness, the forgings should be first quenched from a furnace with atmospheric control at a temperature of 1950 deg. to 2000 deg. F., and then if necessary intermediate anneals of 1350 deg. to 1750 deg. F. may be given. However, the final anneal must be the quench anneal from slightly above 1950 deg. F. in water in order to place the metal in a condition for the precipitation hardening. The hardening temperature should be very closely controlled, being held at a temperature of 920 deg. to 930 deg. F. for a period of 12 to 16 hr.

Since all machining operations excepting the light final cuts or grinding must be done before hardening, it is recommended that the hardening be done in a reducing furnace atmosphere from which the parts may be either furnace cooled or removed and water quenched. If a discoloration of the machined surfaces is not objectionable, the atmospheric control of the hardening furnace is not essential. However, it is very important that a reducing atmosphere be maintained for the quench annealing operation and also that the forgings be held at heat no longer than is necessary to heat them throughout.

The selection of the proper type of corrosion resisting alloy for any special application should be considered with the utmost care. Thorough knowledge of all conditions to be encountered in the service life of the forgings, such as temperature, pressure, and corrosive media, individually or in combination, is necessary. It is suggested that the correct type of alloy be recommended by one of the specialized engineers from the mill who is familiar with the analysis required for each special condition. If the application is of an unusual nature it might be found advisable to conduct several service tests on various alloys or check the suitability of certain materials by duplicating similar conditions in the laboratory. However, it will rarely be found that the research laboratories of the mills producing these alloys cannot give immediate advice regarding all details of type of metal to use, its limitations, and complete fabricating instructions.

The development of new applications in all branches of industry for these newer metals is constantly increasing. More efficiency and longer service life are being demanded by equipment and transportation manufacturers which make it mandatory that drop forgings, properly designed and engineered throughout all stages of fabrication, are used to accomplish the satisfactory fulfillment of their purpose.



# Throw Away the SCRAP BARREL

COLD drawing of steel is a precision operation. And the making of dies for cold drawing requires even more precise technique. Too frequently costly dies end up in the scrap barrel or faults hold up production. In this, the first section of a two-part article, the writer reviews his years of experience and advances suggestions to spare most dies the ignominy of the scrap barrel and accelerate shop output.

THE cold drawing department of many mills may lack the glamor and appeal of some of the highly publicized departments that so intrigue the uninitiated. However, all too frequently this department may be well worth looking into as regards costs and profits. To many, cold drawing is a lightweight among heavyweights in a battle royal—and just as long as steel mills insist upon a tonnage basis for all departmental operations this picture will remain unaltered.

For the time being, this tonnage mania may be ignored and the cold drawing shop examined in some detail merely as a matter of curiosity. First to attract attention is the large volume of steel processed, as compared with the small amount and generally dilapidated condition of the equipment used. In many shops if this condition were to be corrected the department efficiency could be raised to the degree that its importance warrants. Then, by conscientious effort and attractive prices the large number of manufacturers, who today make no use of this product, could be shown that by the use of cold drawn steel they can not only turn out a better product, but do so at reduced cost. The writer

By S. A. MOHT

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firmly believes the results would not only be interesting, but surprisingly so.

Just to watch hard, cold steel, drawn by the magic of the die makers' art into complex shapes—shapes that will be utilized in the manufacture of widely diversified products, ranging from electric razors to plows, from outboard motors to battleships—should result in a realization of how important a part this cold drawn steel plays in the daily lives of everyone. Certainly such an important product should enjoy a constantly expanding market.

In a moment an ordinary bar of steel of no great value is instantly transformed into *cold drawn steel* having definite shape, size and character and of value that disclaims any relation to its parent. Then and there, the conviction is born that tonnage has no rightful place in the picture. This particular department is not only engaged in precision production, but each job is an individual problem re-

quiring expert planning and execution. The product of this department, therefore, should be considered on this basis. A department constantly working within limits of a thousandth part of an inch certainly should not be classified with a department where 1/32 part of an inch is the cause of severe headaches.

Seldom is consideration given to the fact that with steel to be cold drawn, the accumulation of all mistakes (and the writer has learned from sad experience that they are many and varied) from the hammer shop to the annealing department are dumped nonchalantly on the cold drawing department and there, regardless of how seriously production is affected, these mistakes are all too frequently expected to be overcome. At this point the die maker enters the picture. A die maker without outstanding ability and initiative is of absolutely no use to a cold drawing department. He must be familiar with every peculiarity of the various steels he is drawing. He must have a working knowledge of every department that affects his work in any way. And, if only for his own protection, he must be able to make both Rockwell and Brinell

hardness tests. Only with such a background can he become of any value to the department.

Recently, the writer was in a cold drawing department in which everything was running along in its natural stride. But, suddenly, someone for no apparent reason decided to have a "big month". Equipment was taxed to its utmost, and everyone was in an uproar. It is during such exhibitions of "efficiency" that the experienced die maker by his ability, diplomacy, and often a hard-boiled attitude controls production. He must work at a pace entirely out of keeping with the degree of accuracy his work demands. He must instantly recognize, before his dies are ruined, what each department did or did not do so as not to cause delay at the bar machines. He must have the diplomacy to induce the foreman of some offending department to correct, if possible, whatever condition may be responsible for delay. He must maintain such an attitude that will discourage the offending department from committing the same offence too often.

Quite recently a captain of industry referred to die makers as a necessary evil. Everyone is privileged to have an opinion, but the attitude of certain executives that a die maker be classified as non-productive seems somewhat silly. In the cold drawing of steel the die bench is not only the very heart of production, but nine times out of ten the brains as well. The best proof of this occurred in the late labor disturbance the steel mills had to contend with. In the mill employing the writer, practically the first move made by the opposing factions was an attempt to organize the die makers. Both factions arrived at the same conclusion—that when die makers stopped, production stopped.

The greatest detriment at the present time to the art of cold drawing steel in certain shops apparently is the lack of competent and experienced men placed in a position of responsibility giving them absolute control over the department as a unit. Men of this type should be placed in command and invested with authority to demand that steel brought into the cold drawing department be in such condition that it will necessitate no delay in processing. Such men should be consulted in any and all things affecting the department. They should have enough knowledge of the die making craft to recognize good from poor work, and be able to issue instructions to the die maker intelligently, and not leave him depending

entirely upon his own resources. Such foremen should at all times realize that the incompetent die maker acts as a brake on production. In the issue of *THE IRON AGE* of July 6, the writer suggested establishing a set-up within the engineering department from which all technical data relative to the making of dies would be issued. With that thought in mind, six charts were shown as a foundation upon which such a structure could be built. If such technical data from the engineering department are made available to the foremen of drawing departments, some of the weird happenings which occur in certain cold drawing shops could likely be eliminated.

As an example of just such a happening, consider the following case (one of several almost identical cases) of which the writer had considerable knowledge.

The mill involved received an order

because it lacked the necessary data to operate, data that should have been instantly available to anyone interested.

A diligent search of the mill was made with the hope of locating a sample from the last run. The search was successful, but only up to a certain point. Six samples were found, but no two samples were alike. There was no other alternative but to question the customer. The customer forwarded not only a so-necessary sample, but for good measure attached a blistering letter referring to delayed shipments. By this time the whole organization was aroused, and a die finally was made. Ten days later the first steel was shipped, and at the end of two weeks the order was completed. Now, all further business of this one-time customer is handled by a competitor. This incident did not take place 10 or 20 years ago, but recently. And it can happen again tomorrow.

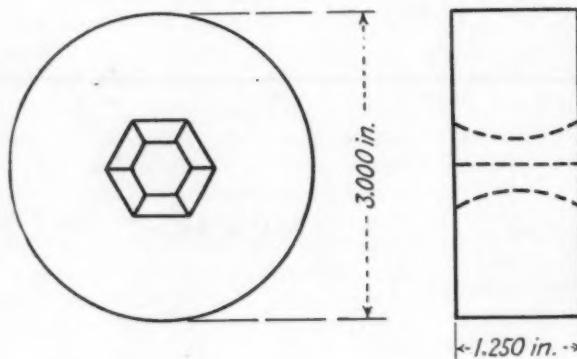


FIG. 1—A 0.500 in. hexagon die of the center-bearing type. Bars may be drawn from either side.

from one of its customers specifying a shipment of cold drawn steel to correspond identically with a previous shipment. Simple enough! But, what actually happened? In due time the order arrived in the cold drawing department and steel was placed on the floor ready to draw. Nothing remained but to place the die in the bar machine and start pulling. Unfortunately there was no die. There were no blueprints or data of any kind available relative to building a die such as was needed. No one, including a superintendent, three foremen, and six die makers—some of whom had been connected with the mill 20 years—knew anything about the job. The simple reason for this was that all of this particular shape of die work was handled by one die maker, and he was absent due to sickness. Two thousand bars of steel rested on the floor and production stopped right at that point. An entire department ceased to function

for the conditions that created the difficulty have not been altered.

In steel mill operations the easiest way of erasing mistakes, generally speaking, is by utilizing the facilities of the melting floor. In the cold drawing department there is one other recourse, that of design and construction of dies of sound principle, sturdy enough to overcome some of the unreasonable demands placed upon them. There are two types of dies in general use—the solid die and the so-called built-up or sectional die. Each has a definite place in the industry with a distinctly separate function to perform, and the common practice of ignoring this fact by substituting one for the other all too often invites disaster. This fact becomes more apparent as these dies are compared later on.

Consider first the solid dies, their outside diameter and thickness. The sizes shown in Table I have proved to

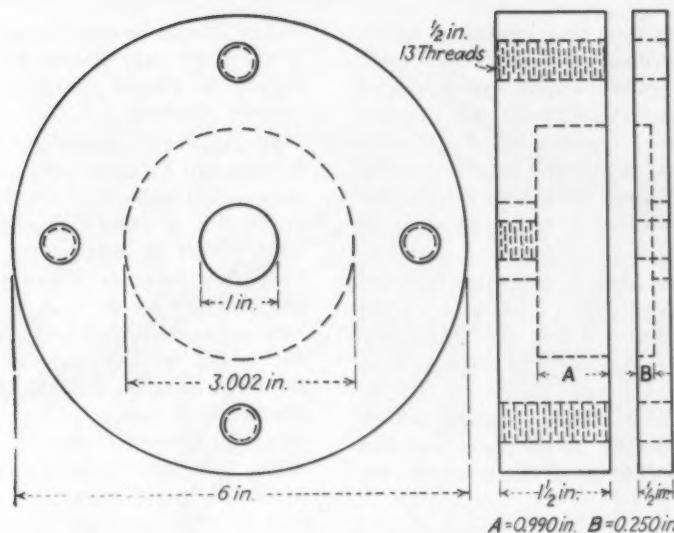


FIG. 2—Holder for a 0.500 in. hexagon die of the center-bearing type. Dies up to 0.650 in. may be used with this holder.

be of ample strength to withstand the tremendous strains to which they are subjected.

In Figs. 1 and 2, a 0.500 in. hexagon die and holder are shown, which if properly made are capable of drawing many thousands of feet of steel. The hexagon is used as an example, but the same applies to all shapes cold drawn. The hexagon is merely the most predominating, and, furthermore, it has in common with all other shape dies the same faults and is heir to the same troubles.

The die shown is inexpensive to make and to the experienced die maker

offers no great difficulty in its construction. But, let the inexperienced die maker attempt to build and place this die in production and he immediately finds himself in more trouble than if he were to try holding a hatfull of hornets. This type of solid die so far as the writer knows, was never used in cold drawing shapes until it was introduced a few years ago. The "throat" radius, the radial center bearing or size-point, and the fact that bars may be drawn from either face, are all features which were adopted after extensive experiments. No claim of originality is made in placing the die

in a nest or holder. This was frankly copied from the automatic screw machine thread-die holder.

The dies of smaller diameter were adopted after tests had proved it was just a waste of steel in continuing to make these dies in the 6-in. die-blank—hence, the holder. A great deal of production over a long period of time has proved conclusively that in sizes up to 0.650 in. this type die, with the proper care while in production and having bars processed correctly for cold drawing, is capable of drawing as high as 50,000 ft. of heat-treated steel in a Brinell hardness range of 262 to 302 before losing size. Hundreds of these dies have been built in the sizes mentioned, and not more than from 3 to 5 hr. is spent on a die. Simple arithmetic alone reveals that such die cost is quite low, particularly when compared with costs and performances of other dies frequently used for the same type of work.

In Fig. 3 is shown the type of die which was supplanted by adopting center-bearing dies in one shop with which the writer was connected. Here again the reference is to all shapes of dies, and not to hexagon dies alone. It will be noted that the bearing, or size-point, is adjacent or nearly so, to face B, and extending backwards to face A the opening increases without any definite regard for size, or throat angle. This one fact alone, may work against this type of die, as will be seen. In Fig. 1, the size point is located in the strongest part of the die-blank, an equal distance from either face. In Fig. 3, this size point is located at almost the weakest point of the die-blank. It is not unusual when drawing bars through this type of die to have a large section of the die face break away. If this occurs while drawing bars of large diameter, it becomes none too healthy in the vicinity of the bar machine.

In Fig. 1, note that the radius of approach or throat is approximately the same from each face of the die. This feature allows the die to be reversed if need be, due to a ring forming, or for any other cause which does not directly affect the size point of the die. Right here is one of the best features of this type of construction. By reversing the die, not only is its life measurably increased, but often, if it so happens there is no other die for replacement, there is avoided a tie-up at the bar machine which would necessitate discontinuing the job until a new die is constructed. If the die involved is complicated, some time may elapse before a new one can be

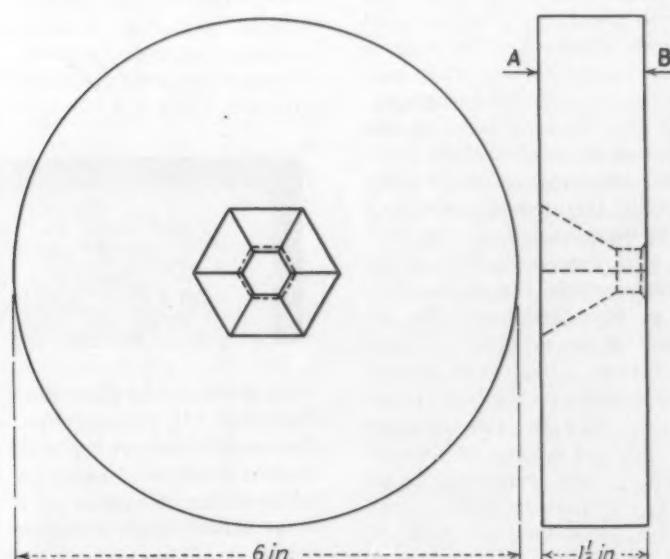


FIG. 3—This type of die is most commonly used. The size point is located nearer one face, and it is not uncommon to have a section of the die face break away.

built. It is obvious that whatever reason necessitated reversing the die in Fig. 1, the same condition would force the removal of the die in Fig. 3 from production.

All bars, both standard and odd shapes, having sharp corners exert a tremendous pressure on a die. And after a die has been subjected to this pressure for some time, it will as a rule develop cracked corners. Many production runs have showed that the die in Fig. 3 can not compare with the die in Fig. 1 in resisting corner cracking. These tests have indicated that in drawing the same lot of steel, when the die shown in Fig. 1 develops

die having this same structural failure while the other die would test perfect. Various grades of steel were subjected to the same test, with the same results. There are various reasons, due to other conditions, that will cause cracked dies. But these tests were made under conditions that were as ideal as is possible.

All dies used in cold drawing steel regardless of their hardness or the steel from which they are constructed will in due time develop a ring. This ring forms in the throat of the die directly back of the bearing and is caused by the tremendous pressure exerted by the bar at the point of con-

maker should be convinced that there is only one safe course to follow in regard to ringed dies—and that is, *remove the ring*.

In shape-dies where the ring must be removed by hand with a file or oil stone, each individual die maker generally has a favorite method of his own, which he swears by. One old time die maker is remembered with deep respect for he was one of those rare geniuses sometimes found at the die bench who always seems to do the right thing at the right time. The die involved was a 0.250 in. ordinary octagon semi-soft die for drawing brass, and was badly ringed. To a novice it would seem like a hopeless task to even attempt to remove the ring and not remove any stock from the bearing, or size point. The old timer took his file and said, "Look, here you file and here." Quickly going over the eight sides of the shape, he fixed the die up just as good as if it were new, saying "see, a goot die you make chust like that." But many dies have to be filed before one is finished "chust like that."

Ed. Note:—Next week the author will describe the making of a center-bearing die, and will discuss the evils of "try out", troubles due to kinky bars, cracked corners, etc.

TABLE I  
Recommended Sizes of Solid Dies

Diameter of Hole in Die	Outside Diameter of Die-Blank	Thickness of Die-Blank
Up to 0.500 in.	3 in.	3/4 in. } Plate dies con-
0.500 to 0.650 in.	3 in.	1 1/4 in. } tained in holder
0.650 to 0.905 in.	6 in.	1 1/4 in.
0.905 to 1.500 in.	10 in.	1 1/2 in.
1.500 to 1.775 in.	10 in.	1 3/4 in.
1.775 to 2.500 in.	12 in.	1 3/4 in.
2.500 to 3.000 in.	14 in.	2 in.

cracked corners which are not due to some bar condition, the cause is due to structural failure of the die steel immediately surrounding the bearing surfaces; whereas, the cracked corners in the die shown in Fig. 3 may be caused by lack of support surrounding the bearing surfaces. In fact, the writer has never seen a type die of Fig. 3 remain in competitive production with a type die of Fig. 1 long enough to develop structural failure.

Repeated laboratory tests made by the writer show this condition resulting in cracked corners is, as a rule, caused by structural failure in the steel; the failure starts immediately below the bearing surface and extends in some cases as deep as  $\frac{1}{4}$  in. Two die blanks were cut off the same bar of stock and etched, both before and after punching, and they proved to be free from any fault. After the dies were made-up and hardened, both to the same Brinell figure, they were again tested and on proving satisfactory were placed in production on the same lot of steel.

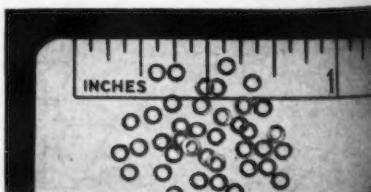
In due time one die would perhaps develop cracked corners, while the other die would remain in production until removed due to natural wear. Another test would show the cracked

tact with the die throat. The pressure at this point will cause a depression to form of varying depth and width according to the amount of draft on the bar, its hardness, the condition of the coating on the bar, the hardness of the die itself, and the lubricant used.

The ring in its first stage isn't serious, but will eventually reach a point that demands attention. The ring is the principal reason for scratched bars caused by the die, and by being common to all dies the ring becomes one of the die makers most serious problems. The experienced die maker confronted by this trouble will first examine the die and if a ring has developed will remove it, before attempting any further diagnosis as to the cause of scratched bars. By removing the ring the problem is almost invariably solved. The size or general innocent appearance of the ring should never be used as a basis in forming judgment as to the amount of damage it can cause. Very frequently in an endeavor to maintain production with a ringed die, an attempt is made to "nurse the die along", with disastrous results. All too often the bar is ripped beyond redemption and the die rendered fit only for the scrap barrel. After a few such attempts, the die

## Very Small Washers Stamped From Bronze

**A** N order of washers so small as to be counted among the world's tiniest fabricated products, was recently turned out by the Wrought Washer Mfg. Co., Milwaukee. These washers, stamped from phosphor bronze to exceedingly close tolerances, measure 0.069 x 0.041 x 0.005 in. In



the accompanying illustration, they are magnified 1 1/2 times. It would require the combined area of over 700 of these minute washers to cover the top of a silver dollar. A quarter of a million of them would weigh less than a pound.

The Wrought Washer Mfg. Co. has recently installed special facilities for producing washers and stampings of very small size, requiring great precision.

Manufacture  
of



By Lieut. Col.

Levin H. Campbell, Jr.  
Ordnance Department  
U.S.A.

# ARTILLERY AMMUNITION

THE army is indeed fortunately situated with respect to the potential supply of brass cartridge cases during time of an emergency. This country is blessed with a practically unlimited supply of copper, and there are many very large brass mills, each with extensive manufacturing setups. Practically all of these companies have adequate press and furnace equipment for the production of large quantities of cartridge cases.

A cartridge case is for the purpose of holding the propelling charge of smokeless powder, and for obturating, or preventing the flow of gas produced by the firing of the powder charge, toward the breech of the gun. Obviously, the objective is to have the entire propulsive effect of the charge exerted upon the base of the projectile, which is secured in the open end of the case by means of crimping. Such a round is known as "fixed ammunition," that is, one in which the projectile and cartridge case form a single unit. Fixed ammunition is used in sizes from the caliber 0.30 rifle to include 6-in. diameter shell. Anything larger than that becomes too heavy for easy handling by the gun crew in rapid firing.

In some instances, cartridge cases

are employed for carrying the powder charge, but do not have the projectile crimped thereto. These cases are mainly used for large caliber howitzers or mortars. In the base of all cartridge cases is pressed or screwed a primer, which is used for the purpose of igniting the propelling charge of smokeless powder within the cartridge case. The primer must have a very

accurate fit within the boss of the case to prevent the escape of gases. Even slight leaks around the primer cause a very material loss of muzzle velocity, with consequent loss of range of the projectile.

Fig. 1 shows an assembled primer and its component parts. A primer is a device used for igniting the propelling charge of smokeless powder carried within the cartridge case. As just mentioned, it is inserted and pressed firmly into place in the reamed primer hole in the base of the case. The finish of the reamed hole and of the exterior part of the primer head must be very accurate and of a very fine finish. This is necessary to prevent the gas generated under high pressure within the cartridge case escaping to the rear. Even a very slight escape has a marked effect upon the velocity, and consequently the range, of the projectile as fired from the gun. In addition to this, the hot gases, if permitted to escape, very rapidly erode the primer seat and the whole case is rendered useless. It must be remembered that pressures often in excess of 34,000 lb. per sq. in. are being dealt with, and the gas is of extremely high temperature.

Referring again to Fig. 1, there is

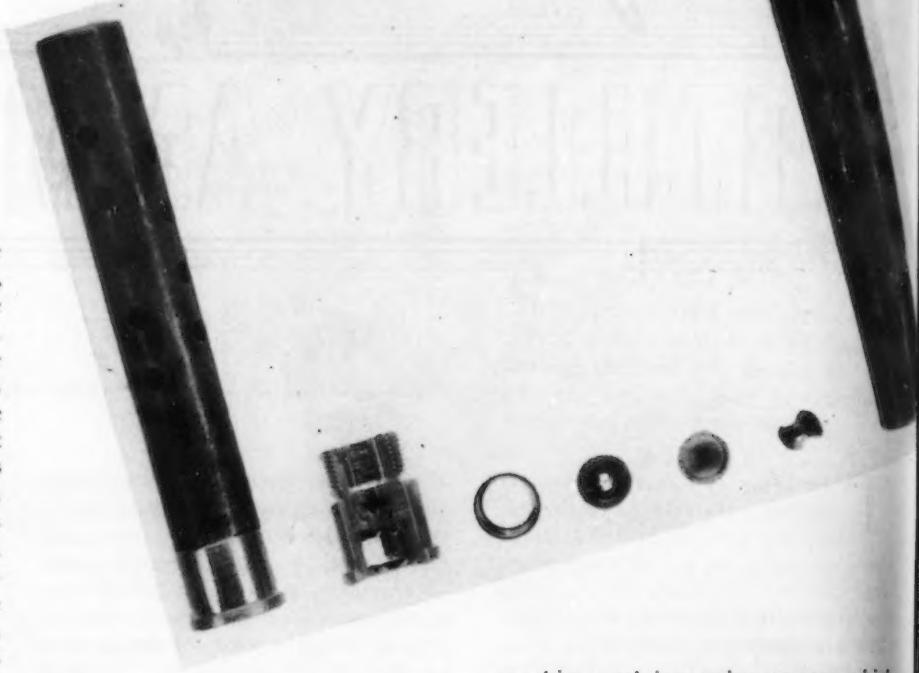
A PREVIOUS article, in the June 15 issue, described the equipment and technique necessary for the efficient production of forged steel artillery shells. Herein, the equipment and procedure recommended for the manufacture of brass cartridge cases are set forth in detail. The author is officer-in-charge of the artillery ammunition department, Frankford Arsenal, Philadelphia, and this article is released for publication by the Chief of Ordnance of the United States Army. Statements and opinions are to be understood as individual expressions of the author and not those of the Ordnance Department.

FIG. 1—Assembled primer and its component parts.

FIG. 2—These are the various stages in the manufacture of cartridge cases.

seen from left to right a complete primer, a sectionalized head assembly, the battery cup, the firing plug, the primer cup, the anvil, and the body. The operation of the primer is quite simple. The firing pin of the gun forces the firing plug downward against the primer cup. The percussion element contained within the primer cup is pinched between the rounded portion of the firing plug and the anvil. This pinching, which, in effect, is merely a sharp blow, causes the percussion element to flash downward into the charge carried in the primer body. This, in turn, is ignited and flashes outward through the holes in the body into the propelling charge within the cartridge case. This flame is very intense and causes an almost instantaneous burning of the smokeless powder propelling charge. To give some idea of the enormous forces generated within the gun, it is of interest to know that it requires something less than 0.008 sec. for the shell to travel from breech to muzzle, and that many projectiles attain a muzzle velocity of 2800 ft. per sec., and even higher. The manufacture of the primer requires accuracy, of course, but with the great screw machine capacity available, it should present but a small problem for mass production in time of war.

There are automatic combination inspection and assembly machines for assembling the parts within the primer head. The capacity of these machines per 8-hr. day is very large, and their design is such that they may be readily duplicated in time of an emergency.



The case must be soft enough to expand outwardly against the walls of the powder chamber to prevent escape of gas toward the breech block of the gun. Equally, it must not be so hard as to result in cracking or splitting. In manufacturing operations these attributes are introduced by means of careful and exact annealing and by the correct design and clearances of the drawing dies.

Within the past year, the cartridge case shop at the Frankford Arsenal has been largely re-equipped with modern, high-speed, hydraulic presses and machine tools used in various manufacturing operations later to be described. Just as for steel shells, the Frankford Arsenal is not equipped for mass production, but the equipment does offer a small laboratory production line employing the latest and best methods known to the art. Drawings are available of punches and dies, and

working and inspection gages, which represent the various cases as being produced from day to day. Thus, manufacturers who may be called upon for mass production may multiply this small setup with a great resultant saving in time required to reach production.

#### Procurement of Brass Disk

It will be of interest to run through the series of operations required in the manufacture of a typical cartridge case for medium caliber shell. Manufacture of all cases falls within the same general routine. Differences in technique appear only as between the number of draws. Referring to Fig. 2, the various stages of the manufacture may be seen. The disk, the cup, the seven draws, the trims, the heading, the tapering, and the machined head are shown.

The brass disk is procured from commercial sources and is of the standard composition of cartridge

brass, 70 per cent copper and 30 per cent zinc. The size of this particular disk is 9.500 in.  $+0.015$  in. in diameter, 0.800 in.  $+0.010$  in. thick, with a weight of  $17\frac{1}{2}$  lb. The disks are purchased annealed and are carefully inspected for surface imperfections, such as cracks or seams. If a case is made of an imperfect disk, the flaws are carried forward in manufacture and there results either a rejected case or a case of very short life. At the Frankford Arsenal, a large number of different caliber cases are manufactured; therefore, in the purchase of equipment presses with as large a range in tonnage as may be economically used have been specified. In other words, funds did not permit the buying of a press limited in its size to a particular operation. Obviously, however, any firm entering upon mass production would use equipment more closely adapted to the single size cartridge case which the company may be making.

#### Manufacturing Operations

The first operation is that of cupping, which is performed on a 350-ton capacity crank press. The actual operation requires 250 tons of pressure. Enormous strains have been set up

within the metal, which are now removed by a thorough furnace anneal at 1148 deg. F. for a time of 125 min. The annealing furnaces with automatic controls are shown in Fig. 3.

After the anneal, the work is cooled by means of a heavy, finely divided spray of tap water, which gives an excellent grain structure. The scale is removed by a 5 per cent sulphuric acid pickle. The cup is then thoroughly washed and rinsed to remove all traces of acid, to prevent future season cracking. The cup is again returned to the press line and is given its first draw. For this there is used a 200-ton hydraulic press, see Fig. 4. The working load required is 190 tons. During this operation the length of the cup is increased from 2.25 in. to a wall height of 3.25 in., and the thickness at the lip of the cup is reduced from 0.702 in. to 0.556 in. A strain relieving anneal at the same temperature of 1148 deg. F. is again given. The same pickle and wash follow. Fig. 5 shows an ideal grain structure which has been found most suitable to maintain in the metal during manufacture.

Then there follow six additional draws with an anneal, pickle and wash after each. The movement of stock, or the displacement of metal, is inso-

far as practicable, divided as between these draws, to give the best metallographic structure for long case life in service. At the end of the seventh and last draw, the length of the cup has been increased from 2.25 in. to a length of 27 in., and the thickness of the lip has been reduced from 0.702 in. to 0.043 in. After the fifth draw the open end of the case is trimmed for an approximate length of two inches, and again after the seventh draw. In the manufacture of a cartridge case where such deep drawing of metal is engaged in, the most highly stressed metal is found at the mouth of the case. In order that this metal will not become a part of our finished case, we have purposely used more metal in the original disk than is actually required, so as to leave stock for discard by trimming.

#### Heading the Case

The closed end of the cylinder has been formed with quite a heavy section of metal, to provide for heading of the case. By this is meant flattening of the base and providing a flange for the extractor of the gun to engage, in order that the case may be ejected after firing. To form this head cold requires a very large tonnage in pres-

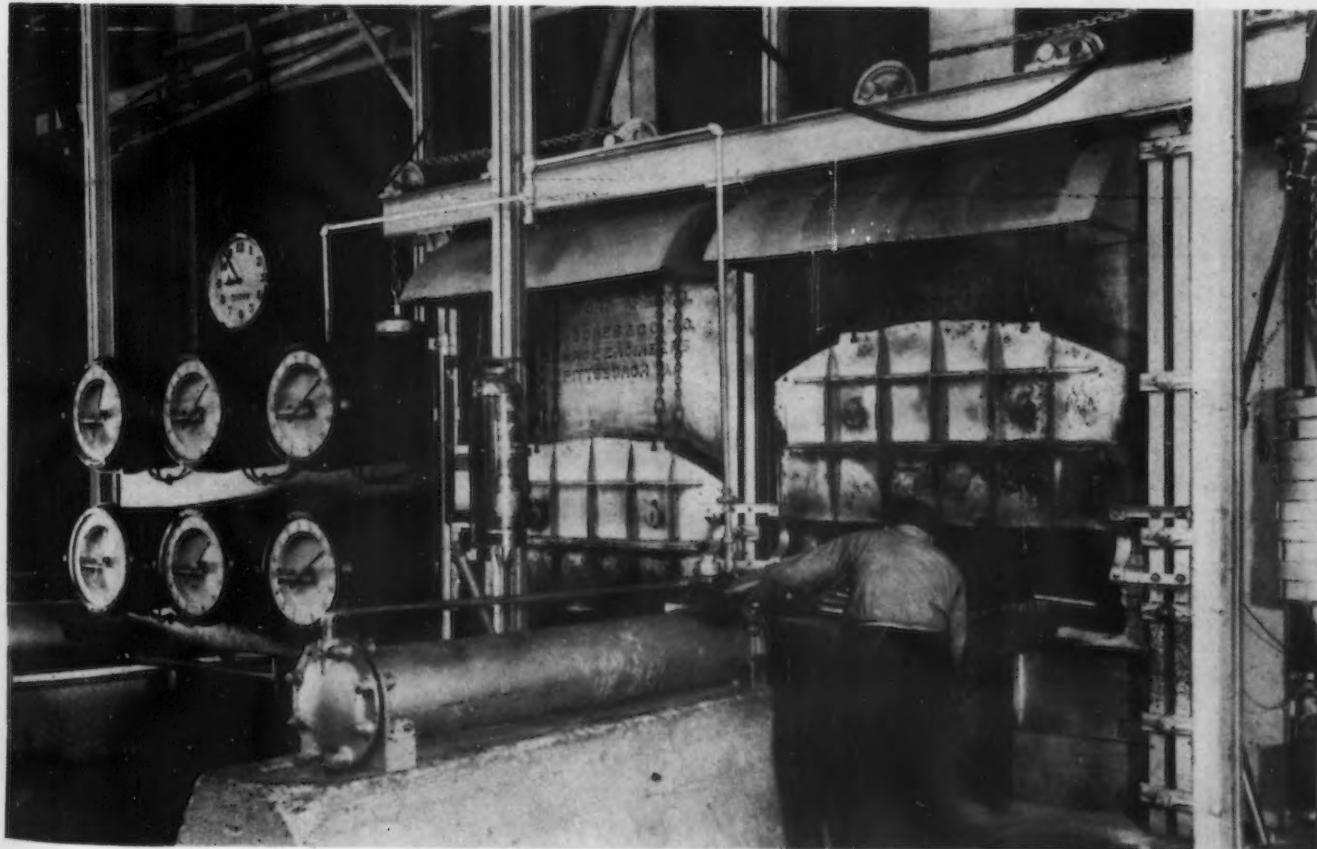


FIG. 3—Cartridge cases are annealed in a furnace of this type.



FIG. 4—Hydraulic press for forming cartridge cases.

sure, and for this purpose a dial feed 2000-ton hydraulic heading press is used. This press has a very high output per hour and has given a uniformly accurate and satisfactory standard of work. During the heading operation, a heavy boss is also formed on the inside at the center of the case. This boss is for the purpose of supporting the primer. The boss is, of course, drilled and very accurately reamed to close tolerances. By the design of the heading dies, the metal at the primer boss is cold worked and hardened, so as to provide a long life for the case at this vital point. The head is finish machined on the machine shown in Fig. 6.

In order to hold sufficient powder

to impart the required velocity to the projectile, the case is of considerably larger diameter in its body than is the shell which is crimped into the mouth. Therefore, the open end of the case must be tapered. Before this operation, however, the end of the case is annealed in a saltpeter bath for some 2 min. at a temperature of 950 deg. F. This removes all strains and softens the mouth and neck.

The case is next tapered by conventional tapering dies, so that the diameter of the mouth is approximately equal to that of the shell. This operation is done on a large mechanical tapering press which has been installed at Frankford Arsenal for some years. The head of the case is now machined to the accurate dimensions required for its proper fit into the gun, and the case is trimmed to exact length.

Every case is next put through a most careful inspection for compliance with dimensions. In order to relieve all working strains and thereby insure against season cracking, insofar as possible, the cases are given a low temperature anneal at 451 deg. F. Five cases are then picked at random from a lot, and if satisfactory performance is given during firing at the proving ground, the lot is accepted and shipped to the loading plant.

#### Future Developments

Experimentation and development is constantly being carried on in an effort to reduce the number of draws required, and to increase the drawing

speed. Recently, the use of carbide dies has been undertaken with marked success regarding quality and finish of the case, and long life of the dies. There has been equal success in reducing the number of draws required in the production of the various calibers of cases.

A very attractive possibility presents itself in making a case from a drawn or extruded brass tube, suitably secured to a forged brass or steel base. Were such a case to prove practical in service, much of the expensive press and furnace equipment could be eliminated. The time required to reach production in time of war and the cost would be greatly reduced.

The ideal cartridge case is one which will satisfactorily perform its functions of holding the powder charge and obturating the powder gases upon the firing of the gun, and yet, one which may be made at such a low cost as to permit its being discarded upon the firing of the round. The cost of the cases which are now used does not permit of such procedure. Rather, they, after a relatively few rounds have been fired, must be returned to a well-equipped depot and resized. In a major conflict, this becomes a serious problem in transportation and supply. The Ordnance Department is hopeful that such a throw-away case is possible of development.

There remains much to do, and yet, with all, modern day technique is vastly superior to that employed during the World War.

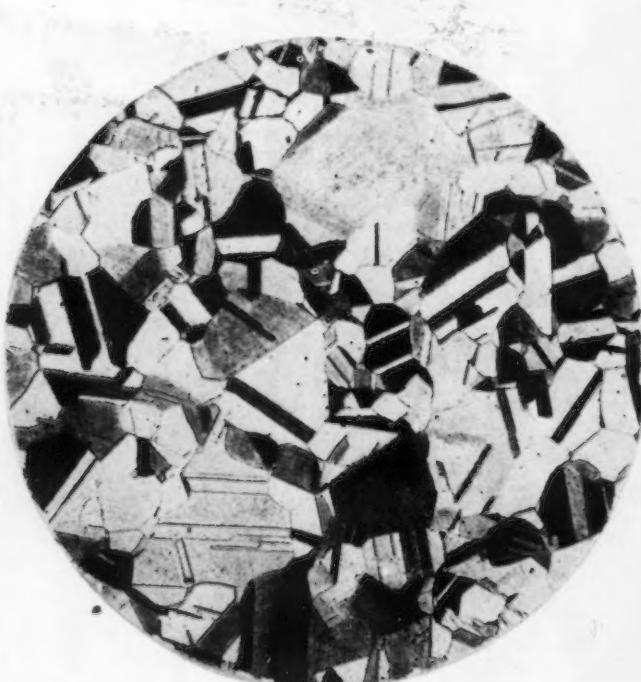


FIG. 5—Ideal grain structure for cartridge cases.



The Detroit-Canada tunnel, 5500 ft. long, demonstrates the suitability of porcelain enamel steel tile for lining work in underground and under-water construction. Enamelers and steel companies producing enameling sheets foresee a promising market in this field.

## STEEL TILE STAND UP

THE steel industry has shown great interest in the evidence recently revealed in regard to a steel-based product for lining subways, tunnels, and other underground construction.

This evidence is contained in a report of the Robert W. Hunt Co., inspection engineers, Chicago, following an investigation of the condition of the porcelain enameled steel lining of the Detroit-Canada tunnel, which has been in service nearly nine years. This test has covered a long enough period of service to give a sound indication as to the durability of the tunnel lining and the maintenance experience up to this time.

Richard H. Vose of the Hunt organization, summarizes the findings as follows:

"Our observations of the present condition of the porcelain enamel, together with information on conditions of installation, exposure, replacement and service, lead to the conclusion that porcelain enamel steel tile can be furnished which, properly installed by competent craftsmen, will form a lining eminently suitable for all of the requirements of sub-aqueous vehicular tunnels.

"The tile examined in place in the tunnel or removed indicate no corrosion whatever has taken place on the

tile except where unnecessary outside mechanical abuse has exposed the base metal to moisture, and we find no deterioration which can be charged directly to the type of material."

The porcelain enameled panels used in the tunnel measure 6 x 12 in., with 18-gage steel used as the base metal. The high reflection factor of the porcelain enamel surface is an excellent aid to illumination of the tunnel.

Regarding maintenance, Mr. Vose says, "the tile faces are washed periodically by spraying with a solution which cleans off the condensation moisture, rusty stains and accumulated soot, but the hard deposits from the precipitation of solids from the water are removed by scrapers and steel wool. The restored surface is perfect and shows excellent reflectivity . . ."

"The total of replacements appears to be something over 400 annually, about equally divided between replacing the displaced tile and repair over areas uncovered to repair concrete. As there are some 220,000 tile in the lining, this replacement is about 0.2 per cent yearly."

The report stresses the value of careful installation methods and draws this conclusion:

"From the examination it appears that all faults observed in the porcelain

tile lining are due to avoidable causes and that there is no deterioration directly attributable to the inherent qualities of the tile. We were unable to discover any crazing of enamel."

"Some displacement of the tile by frost action," says the report, "is the direct result of wrong methods of installation and could have been obviated by furring out from the concrete, allowing drainage space behind the tile, when a perfect surface could have been obtained and retained."

So much experience has been gained in the manufacture and erection of enameled architectural parts during the years since the tunnel was completed that current installations are solving all problems of this sort without difficulty.

Testimony that a tunnel or subway lining similar to that installed at Detroit would be entirely satisfactory, when installed with the careful methods now used, is contained in the closing paragraph of the Hunt Co.'s report:

"In our opinion porcelain enamel tile so furred out, well bonded to the mortar, set with  $\frac{1}{8}$ -in. joints filled with a mastic caulking compound, will result in a first-class job, high in utility, low in maintenance, and satisfactory for the intended purpose."

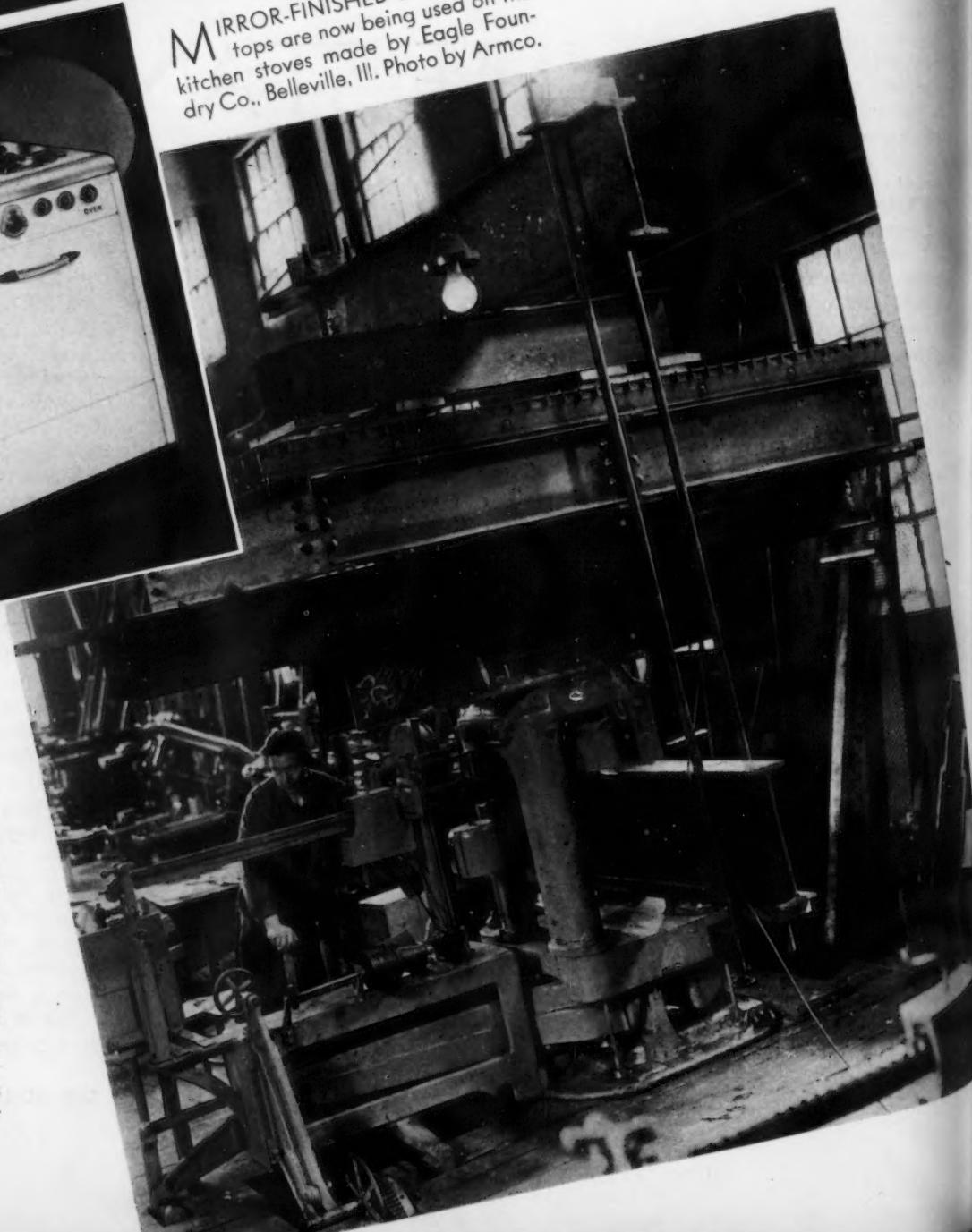
# What's New

## AT LEFT

THIS special die will be used at the Milwaukee plant of the Allis-Chalmers Mfg. Co. for punching the segmental steel rim laminations for a 32-ft. diameter rotor of a large water wheel generator. Accurate to 0.005 in. in every dimension, this tool assures that when the laminations are punched and stacked they will match perfectly. The two halves, weighing about 1500 lb. each, are each 15 in. wide by 4 ft. long.



AT LEFT  
MIRROR-FINISHED stainless steel tops are now being used on the kitchen stoves made by Eagle Foundry Co., Belleville, Ill. Photo by Armco.



## AT RIGHT

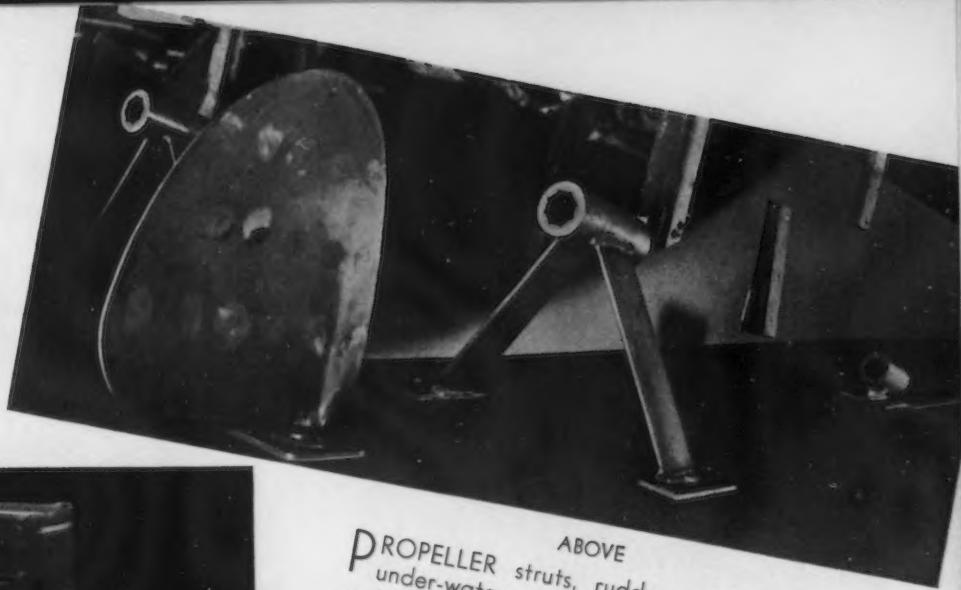
AN I-Beam-Lok open floor bridge section, produced by Carnegie-Illinois Steel Corp., is shown being subjected to load tests at Pittsburgh Testing Laboratory. Although designed to safely sustain truck axle loads of approximately 45,000 lb., tests for stress and deflection on 4-ft. x 4-in. spans proved the unit's ability to withstand as much as 130,000 lb. without danger of failure.

New!



ABOVE

REPRODUCTION and etching of actual photographs in stainless steel is now being carried out commercially by Stainless Steel Products Co., Box 1439, Youngstown. Basis for the work is etching of halftone images in reverse or intaglio on polished stainless, after which the etched portions are filled in with pigments of various sorts and the image appears in positive. Most popular subjects are individuals and pets (see accompanying illustration), and most popular forms are testimonial and portrait plaques, memorial and building plates, golf course markers and book ends. The company uses Enduro stainless for this work.

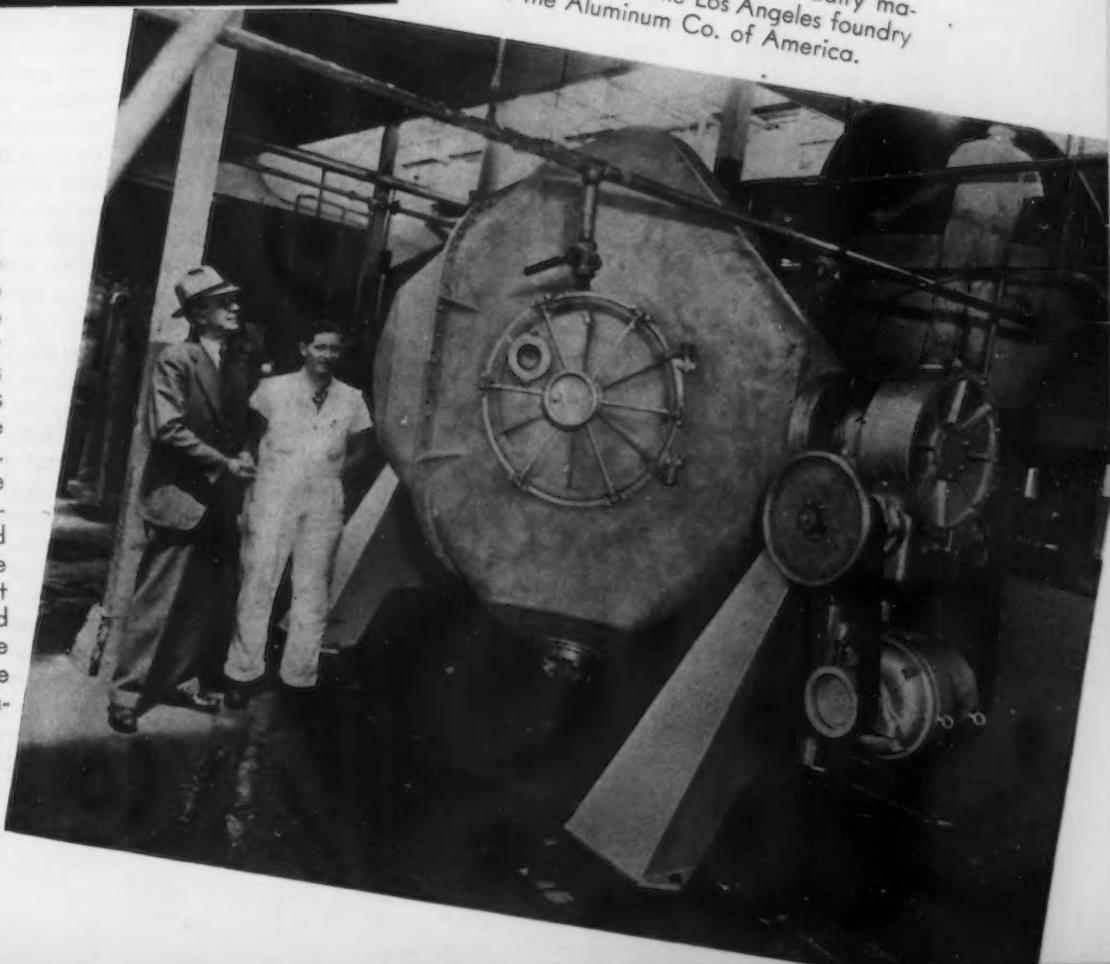


ABOVE

PROPELLER struts, rudder, and similar under-water parts are welded on a new cruiser built by Consolidated Ship Building Co. Such parts ordinarily are cast. Two pieces of Monel sheet, 16 gage, were spot welded to three internal ribs of Monel strip and welded along the edges to form the rudder. The rudder stock is Monel tubing carried through a port made of the same alloy. The legs of the struts are of Monel strip, bent to form one streamlined section, and joined by welding.

BELOW

WHAT is said to be the largest churn in the country has just been built by the Jensen Creamery Machinery Co., Oakland, Cal., and installed in the Challenge Cream & Butter Association plant at Oakland, Cal. It is constructed from two sand-cast aluminum shells which, together, weigh 1500 lb. The huge aluminum castings which make up the body of this new dairy machine were cast at the Los Angeles foundry of the Aluminum Co. of America.





Nickel silver being tapped from an electric furnace at 2400 deg. F. into a bank of rotating molds.  
Photo by Ewing Galloway.

FOR convenience, this discussion of defects in non-ferrous ingots is divided into surface and internal defects, the two being examined in turn from the point of view of their occurrence and elimination in ordinary casting practice. Reference will, however, be made to various newer casting methods involving considerable departures from ordinary practice, the object being to obtain more perfect ingots.

**SURFACE DEFECTS—OXIDE PATCHES:** One of the most obvious and at the same time most easily avoided surface defects in non-ferrous ingots is the trapping in the surface of the ingot of folds of oxide skin. In the first place it is important that the stream of metal from the crucible be clean. If dross is allowed to pass into the ingot, trouble is inevitable, but this is readily avoidable by careful skimming or, where justified by special circumstances, by the use of a bottom pouring ladle.

The cleanest of streams, however, is liable to oxidize during pouring, and, if exposed to the air, an oxide skin also forms on the surface of the molten metal in the mold. This skin

is likely to break and fold, causing more or less serious surface irregularities and preventing in some cases the remelting of splashes of metal thrown up onto the mold wall by turbulent pouring. Such defects will obviously give serious trouble in rolling or forging, although their effects can largely be removed by scalping prior to rolling or after breaking down.

In the case of alloys like brass, composed of metals with readily reducible oxides, the formation of an oxide skin in the mold can be avoided by pouring in a reducing atmosphere. This is normally effected by coating the inner faces of the mold with a volatile coating consisting generally of an oil or a graphite and oil mixture. On contact with molten metal the mold coating is volatilized, ignites at the mouth of the mold and both fills the mold with reducing gases and surrounds the incoming stream with a luminous reducing flame.

Where the alloy contains elements with a high affinity for oxygen, such as aluminum, a volatile oil-base coat-

ing is ineffective in preventing oxidation. With aluminum alloys, therefore, and with copper alloys containing aluminum, oxidation during pouring cannot readily be prevented, and oxide folds in the surface of such ingots are best avoided by methods such as non-turbulent pouring, in which advantage is taken of the strength of the alumina skin.

More or less tranquil pouring is generally effected in the pouring of aluminum rolling slabs by running the metal down one edge of a mold initially in a horizontal position and gradually bringing the mold to the vertical position. Such a method of pouring, if carefully carried out, does not break the surface oxide skin which forms a more or less tight envelope over the liquid. Thus alloys containing aluminum can be successfully poured by ensuring that the oxide skin is continuous and is not broken during the pouring operation, whereas an aluminum-free brass for instance cannot be poured in this way as the oxide skin is not strong enough.

\*Abridged from a lecture presented before the Midland Metallurgical Societies, Birmingham, England.

# Defects IN

and even with the Durville process is liable to break up and form small ridges.

There is, however, an alternative method whereby aluminum-free brasses can be poured in air without oxide skin troubles, and that is by the addition of phosphorus, the presence of which prevents the formation of a skin of solid oxide. Phosphorus to the extent of 0.05 per cent, however, has a considerable effect on other properties of brass, notably in raising the re-crystallization temperature after cold working. After ensuring a clean stream, therefore, inclusions of oxide skin can be avoided either by pouring under such condition that oxides do not form on the surface of the metal in the mold, or alternatively by allowing a strong oxide skin to form and pouring under conditions of such tranquillity that the oxide skin is not broken during the pouring operation.

LAPS AND SPLASHES: Turbulent pouring, apart from its effects on the surface skin of oxide, also results in

There is, however, a possibility of introducing another type of surface defect from the mold itself. Damp molds, of course, give trouble due to the generation of steam. Apart from this, however, if a high melting-point alloy is poured in cast iron molds under conditions causing local overheating of the mold surface, a new defect is encountered. Where the stream of metal runs down the face of the mold this becomes sufficiently over-heated to give off gas due to a reaction between the oxidized mold face and the combined carbon in the iron. While the alloy is in a pasty condition this gas forces itself into the ingot, forming surface holes.

With aluminum alloys, this situation does not arise owing to the lower casting temperature, and with ordinary brasses it is easily avoided by keeping the mold temperature down to something of the order of 210 to 300 deg. F., and avoiding steady impingement of the incoming stream on a particular area of the mold face. A

thermal conductivity of copper prevents the setting up of the severe thermal stresses in the mold wall which are responsible for the cracking of cast iron molds.

INVERSE SEGREGATION: Lastly on the subject of surface imperfections, reference should be made to the formation of a surface layer or of globules of a low melting point constituent on the surface of the ingot. This is particularly serious in aluminum alloys containing a low melting point constituent, which may be the aluminum-iron eutectic in commercial aluminum or the aluminum-copper eutectic in the duralumin type alloys.

When the initially formed shell of solid metal shrinks away from the mold wall a small space is left in which the eutectic is liable to run, either filling up the space completely or forming globules at particular points. These eutectics are hard and brittle and affect the rolling properties of the surface layers. An enormous amount has been said and writ-

## NON-FERROUS INGOTS\*

By G. L. BAILEY, M.Sc.

a considerable amount of splashing, small globules of metal being thrown up by the incoming stream. The volatilization of the oil-base mold coating, where used, also causes much splashing. These splashes solidify on the cold wall of the mold above the surface of the metal and if the pouring temperature and rate of pouring are low, there is not sufficient heat in the liquid metal as it rises up the mold to remelt them completely.

Similarly, a low pouring temperature, particularly if accompanied by a slow speed of pouring, may result in transverse folds along the length of the ingot owing to the periodic partial solidification of the upper surface of the metal during pouring. Such defects are readily avoided by pouring at a sufficiently high temperature and with sufficient speed, provided the splashes are not badly oxidized, and in ordinary brass practice it is safe to say that the higher the pouring temperature and the more rapid the pouring, the better the surface.

BLOWING, AND MOLD DEFECTS:

volatile mold coating in itself has a great effect in preventing overheating of the mold face by providing an insulating layer between the molten metal and the mold. With higher melting-point alloys the danger of overheating to an extent sufficient to give this trouble is increased, but when the cause is appreciated it is not difficult to avoid blowing.

A second type of surface defect which may be caused by the mold is due to the tendency of cast iron molds to crack transversely after repeated use. Such cracks are caused by thermal stresses resulting from the steep temperature gradients in the mold wall immediately after pouring. It is general practice to reject molds which are sufficiently badly cracked to affect the ingot surface seriously in this way.

Both blowing and surface cracking of the mold are avoided by using copper-faced molds. The water-cooled copper-faced mold is now widely used, and its satisfactory behavior is due primarily to the fact that the high

ten about the causes of inverse segregation and of the formation of exudations of this type. Some metallurgists consider that the evolution of dissolved gases during the later stages of solidification provides the internal pressure which forces the eutectic out on to the surface of the ingot, and there seems no doubt that gassy metal shows an increased tendency to exudations. On the other hand, the author does not believe gases to be by any means the sole or even the main factor responsible, but the work in progress on the subject at the British Non-ferrous Metals Research Association is not sufficiently advanced to permit any completely satisfactory explanation nor does it suggest immediate remedies for this trouble.

INTERNAL DEFECTS — EVOLVED GASES: The most important types of internal defect encountered in ingots are produced by the inclusion of gases either as spherical cavities or as interdendritic voids of irregular shape. The shape of the voids produced by the rejection of dissolved gases during so-

lidification depends largely on the temperature gradients in the casting and the freezing range of the alloy concerned. In a material with a short freezing range, such as commercial aluminum, more or less spherical cavities result which are liable to form blisters in rolled sheet.

On the other hand, with an alloy like 95/5 tin-bronze which has a fairly long freezing range, cavities due to evolved gas from inter-dendritic fissures which are not very obvious but which form considerable areas of discontinuity and have a markedly adverse effect on mechanical properties. In the case of brasses the high partial pressure of zinc vapor in the molten metal prevents the solution of gases, and brasses are therefore not liable to trouble from this cause.

Deleterious gases may be introduced with the charge, either in scrap metal or as moisture in superficial corrosion product, moist fluxes, etc. Dissolved gas cavities, however, can be considered as having their main source in the melting operation. In general, the most important deleterious gas is hydrogen, absorbed either as such owing to melting in a reducing atmosphere, or more commonly absorbed by reaction of the molten metal with water vapor in the furnace atmosphere. In the case of aluminum this reaction with water vapor has been shown by Hanson and Slater to be the most important cause of gas holes, the oxide formed being inert and insoluble in the metal, the hydrogen only being absorbed.

With copper and certain copper alloys both hydrogen and oxygen can be absorbed and can exist together in the molten metal, reacting on solidification and evolving steam. It is not easy to prevent gas absorption during melting, particularly to avoid contact of the metal with water vapor. In the case of aluminum alloys the most effective remedy is the use of degassing treatment prior to pouring, and quite a number of such treatments are available.

With copper alloys, melting under oxidizing conditions has a very considerable effect in preventing gas absorption both by avoiding the presence of excessive reducing gases in the furnace atmosphere and by increasing the oxygen content of the molten metal, which has the simultaneous effect of reducing the hydrogen content. The problem is not quite so simple as this as other gases in addition to hydrogen are likely to be absorbed, and it is not possible with

many alloys to produce sufficiently strong oxidizing conditions completely to prevent the absorption of reducing gases. Degassing treatments have also been suggested for copper alloys, but a thorough discussion of such methods and of the whole question of gas unsoundness and its avoidance cannot be incorporated in this paper.

**ENTRAPPED GASES:** Gas cavities in ingots are not always due to evolved gas but may originate in the trapping on solidification of gases from the mold atmosphere carried into the ingot during pouring. Where a volatile mold coating is used, as in ordinary brass casting, volatilization of the coating in contact with the molten metal inevitably results in the projection of gases into the ingot where they are liable to be trapped under conditions of rapid solidification. Cavities of this type are seriously detrimental in that being near the surface they readily form blisters in rolled strip which have a very thin skin of metal over the surface. This skin of metal is easily ruptured in the later rolling operations or removed by annealing and cleaning processes.

Apart from cavities of this kind, however, with ingots poured in the usual manner, a stream of metal penetrating well into the solidifying metal already in the mold inevitably injects small bubbles of air or other gases from the mold atmosphere. These small bubbles are very readily entrapped, particularly if the ingot is of thin section, and may be more deep-seated than the other cavities mentioned. The presence of fine cavities of this type is readily shown by machining the surface of an ingot with a number of very fine cuts using a sharp tool.

The wider the section of the ingot, the slower the solidification and the less the danger of entrapped gases. Where thin ingots are necessary, the first and most obvious step for the avoidance of cavities of entrapped gas is to pour the metal at as high a temperature and rapid a speed as other conditions permit. This allows the metal a longer period of solidification during which entrapped gases can escape. Other factors are, however, of importance, not the least of which is the position of the mold.

In older practice, ingots for strip rolling were commonly poured with the mold inclined at an angle against the pouring bench. This was particularly used when pouring direct from the crucible, in order to avoid excessive impingement of a single heavy

stream on the face of the mold. The use of an inclined mold, however, has the effect of increasing the tendency for trapping gases under the upper surface of the ingot. Pouring the ingot in a vertical mold requires the use of a pouring bowl, but this has the added advantage that instead of being poured in a single heavy stream the incoming metal can be distributed in a number of small streams across the width of the ingot. The momentum of a number of such small streams is naturally not so great as that of a single heavy stream to give the same rate of pouring, and the incoming metal does not penetrate so deeply into the metal already in the mold as with a single stream. Bubbles, therefore, are not carried down so far into the ingot, and have a better opportunity of escaping. For the complete avoidance of injected gases, however, some method of non-turbulent pouring which avoids the carrying of gases into the ingot is desirable.

**SHRINKAGE:** Contraction on solidification results in piping of the head of the ingot, which of course must be fed in some way. This is usually looked after by following up with small additions of metal, the use of a hot top as is common in steel practice being very rare in the non-ferrous industry. The hot top is an ideal method of feeding contraction, but is liable to introduce difficulties, particularly if particles of refractory become detached and trapped in the ingot.

With tough pitch copper a level set is obtained as gas evolution just counterbalances the shrinkage contraction, and tough pitch copper can therefore be cast very satisfactorily in open molds without getting localized shrinkage defects. There is some disadvantage, however, in the open mold casting of copper in that oxygen is absorbed at the exposed face giving a thin layer of less ductile material which may persist in the wrought product, and a more extensive adoption of vertical casting for tough pitch copper wire bars and smaller shapes is anticipated.

In the case of chill cast ingots of the ordinary type, shrinkage cannot generally be fed completely, the result being that the ingots contain internal cavities which are commonly concentrated more or less in the center of the section where they are not so serious, as they are liable to be in sand castings. With long thin ingots such as are widely used in casting copper alloy ingots for strip rolling, central shrinkage unsoundness is almost impossible to avoid.

If the mold is filled rapidly it is impossible to obtain in a long thin ingot the directional solidification from the bottom towards the top which is necessary for the complete avoidance of shrinkage cavities. The slower the pouring speed, the closer the approach to directional solidification. From the practical point of view, the best way of reducing internal shrinkage cavities is to cast thicker ingots of a shorter length. If such ingots are properly fed so as to keep the top of the ingot hot, then approximation to directional solidification is more readily secured and internal shrinkage cavities will be correspondingly reduced. Contraction after solidification, causing ingots to hang up in the mold, can with some alloys, particularly those subject to hot shortness, cause cracking, and this may impose a limitation on the dimensions of ingot which can be cast in certain alloys.

**NON-METALLIC INCLUSIONS:** Reference has already been made to the dangers of including folds of oxide skin in and below the surface of the ingot owing to turbulent pouring. Apart from major defects of this kind and the inclusion of lumps of dross owing to improper skimming, there is danger with many alloys that fine particles of slag or oxides in suspension in the molten metal will find their way into the ingot. Such particles not only form non-metallic discontinuities having an adverse effect on the strength of the metal but are likely to result in fine surface blemishes in rolled metal and, where oxides are very hard, to give trouble in machining operations.

A thorough discussion of the subject of deoxidizers would again require a great deal of space. Some oxides when distributed finely throughout the bath of molten metal are very difficult indeed to get rid of as the particle size is small and the difference in specific gravity between the particle and the metal bath not great. Alumina in copper alloys is a case in point and aluminum, although it has a very high affinity for oxygen, is a very unsatisfactory deoxidant for copper alloys, owing to the difficulty of ensuring the removal of fine alumina particles from the molten metal. Phosphorus is the most commonly employed deoxidant for copper alloys and owes its utility to the fact that it forms fluid deoxidation products of the phosphate type which readily aggregate into particles of sufficient size to rise to the surface of the melt.

Where oxidizing melting conditions have been used, it is important as far

as possible to deoxidize the melt before making additions of elements like tin, the oxides of which, once formed, are not easy to remove. Correct deoxidation is also very important in the case mentioned earlier of alloys which are liable to gas unsoundness owing to reaction between a readily oxidizable element and dissolved oxygen existing in equilibrium in the melt. Copper and certain nickel alloys are particularly important in this connection, and a wide variety of deoxidizing agents including such materials as the alkali and alkaline earth elements have been suggested for this purpose. To ensure complete freedom from oxygen some excess of the deoxidizing element is necessary, and this must be chosen therefore having regard to the effect of this excess on the properties of the material. Having ensured as far as possible a bath of molten metal which is free from oxides and other non-metallic inclusions, it is important to avoid the introduction of oxides during pouring either by pouring in an inert atmosphere or, as mentioned in the first section, by pouring without turbulence so that the skin of oxide on the surface of the metal itself protects against further oxidation.

From time to time novel methods of pouring are put forward requiring the use of quite different equipment and designed to achieve to the maximum extent some of the results which have been indicated would be desirable. One of the earliest and most widely used of these casting methods is the Durville process, the aim of which is to reduce turbulence during pouring to the absolute minimum. Its use is particularly desirable in the case of aluminum alloys or alloys containing aluminum, where the avoidance of breaking and folding of the surface skin of oxide on the molten metal is so important. An aluminum oxide skin is sufficiently strong to give a clear, smooth surface on ingots cast in this way, and shrinkage can be minimized by the use of a very low casting temperature. In the case of ordinary brasses free from aluminum, the zinc oxide skin is not sufficiently rigid to give a smooth surface, and if it is desirable for some reason not to add the very small amount of aluminum necessary to form an alumina skin on the liquid metal, some method must be provided for preventing access of air, such as the covering of the space between the mold and the ladle with a luminous gas flame. There are obviously some undesirable features about this process from the

manipulative point of view, but the author is of the opinion that rolling slabs of the highest quality, combining smoothness of surface with complete freedom from entrapped gas cavities and the minimum of shrinkage cavities, can be made by this method.

Another method more recently advocated for pouring rolling slabs is the Erical horizontal water-cooled mold. This is not to be confused with the original Erical vertical water-cooled mold, in which the plates forming the mold face were of a high-nickel alloy designed so as to expand inwards after pouring, compressing the ingot during solidification. This latter method is open to a number of serious objections and has not made great progress.

The horizontal mold is to some extent a return to the practice of open slab casting, but under conditions designed to provide directional solidification of the slab by water cooling the bottom of the mold, and delaying solidification from the sides so that really sound metal is obtained with every opportunity for gases and inclusions to rise to the top surface. The thickness of slab recommended is 3 to 4 in., and a considerable amount of machining is necessary on the upper and under surfaces before rolling, but it is then claimed that the metal is of very high quality.

Recently a large number of patents have appeared covering various methods of pouring aluminum ingots with minimum turbulence. The main point of these methods is that the mold has a slit down one side through which the metal is introduced, and during pouring the mold is lowered and the slit closed by various means. The base of the mold is lowered during pouring, keeping the metal surface in an approximately constant position, and the side of the mold is also continuously built up to about the same position. Such methods of pouring result in very little turbulence owing to the fact that the metal is always introduced at the level of the surface of the metal in the mold, while, according to this method, the mold can be lowered steadily into a cooling bath which causes rapid solidification from the bottom upwards, giving that directional solidification which is so desirable to eliminate both shrinkage and gas cavities. The author has had no experience with this method, but mentions it to indicate some of the procedures which are being suggested to attain some of the objectives which have been indicated as desirable.

# NEW TYPES OF HEAT-TREATING AND

**P**HOTOELECTRIC detection of the position of a light beam reflected from the mirror of a galvanometer is still used in a new vibration-proof Celectray indicating controller, the principal change being in the damped photoelectric circuit which does not respond to abnormal disturbance of the light beam. So far as vibration is concerned, Celectray model V acts somewhat as a filter in that the action of vibration on the galvanometer cannot be transmitted through the instrument to the control device, such as a magnetic contactor. Vibration does not cause the primary relay within the instrument to operate, nor does it interfere with normal action of the controller. Like other models made by the *C. J. Tagliabue Mfg. Co.*, Park and Nostrand Avenues, Brooklyn, the model V retains the safety shut-off feature and a 15-in. circular scale.

## Reset Control

**W**HERE widely varying load conditions in continuous processes have heretofore made automatic control difficult or impossible, the *American Schaeffer & Budenberg Instrument Division of Manning, Maxwell & Moore, Inc.*, Bridgeport, Conn., is



ABOVE

**A**DAMPED photoelectric circuit makes vibration-proof the model V Celectray indicating pyrometer controller. The action of vibration on the galvanometer mirror cannot be effectively transmitted through the instrument to the control device.

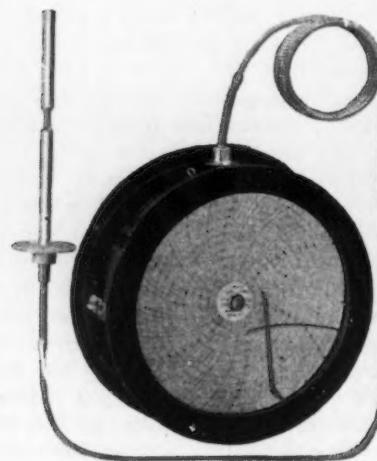
**I**MPROVEMENTS continue apace in instruments for controlling and measuring temperatures, pressures and other factors governing heat-treating and process work. During recent months a number of controls have been introduced for governing the rate of flow of gas, oil and air in furnace firing. Accessory apparatus described includes a gas calorimeter and a pocket  $\text{CO}_2$  indicator. Longer life is assured in a new type of heat-treating box, and longer electrode life is claimed for a new design of electric pot furnace.

• • •

offering an independent reset control, known as the Micromoto reset. It begins to function immediately when a change in load occurs and brings the controlled temperature back to the de-

## BELOW

**S**ERIES 150 Wheelco recording thermometer is designed to meet industrial requirements from 0 to 1000 deg. F. Chart may be rotated by either spring-wound clock or synchronous motor. Pen arm is chromium plated at tip to prevent corrosion and assure freedom of operation. The thermal system consists of a sensitive remote bulb, capillary connecting tube and Bourdon spring. Vapor pressure, liquid expansion, gas pressure or mercury expansion can be used in the thermal system.

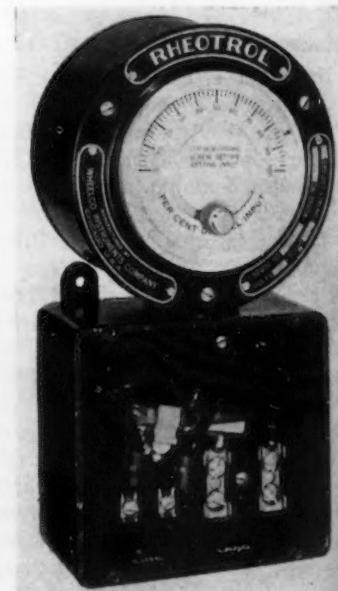


sired point as rapidly as the process will permit.

This reset control can be originally applied in "American" Controlographs or may be added to existing control instruments utilizing either American or other control instruments. On applications where existing controls are of the wide throttling range type, the Micromoto reset unit can be installed in the diaphragm motor valve line without touching the control instrument.

## Manual Electric Furnace Control

**R**HEOTROL is the name given a simple power input controller for electric furnaces, recently introduced by *Wheelco Instruments Co.*, 1929 S. Halsted Street, Chicago. It incorporates rotating cams operating switches to effect make and break control, and stepless adjustment of the on-off ratios is accomplished by variable ratio settings of the cams. Control of the heating rate is effected once a minute. For



**T**HE Wheelco Rheotrol functions to balance the heating rate of furnaces and ovens by an on-off control cycled every minute. Shown is Model 684 with mercury switch. Dial reads in per cent of full input.

# PROCESS CONTROL APPARATUS

example, if the dial is set to 30 per cent control, the power is on for 18 sec. and off for 42 sec. Two models are made, one with micro switches, the other with a mercury switch capable of carrying 35 amps.

## Gas Furnace Controls

A NUMBER of instruments have been introduced in recent months for obtaining closer control of gas fired furnaces and ovens. The *Bristol Co.*, Waterbury, Conn., for example, has brought out a flow ratio controller for maintaining the flow of one fluid in definite ratio to a second such as between the flow of air and fuel gas, or between natural gas and artificial gas. The set-up consists of two instruments, a standard flow recorder and a standard flow recorder controller. The rate of flow is measured and recorded by one instrument, which also sets the control point on the second. The latter then records and controls the flow proportionately to the first, depending upon the ratio selected.

*Wheelco* has developed a self-contained electric control valve for throttling of gas, oil or air flow to furnaces and ovens. Combining valve and operator in a totally inclosed unit, the electro-thermal expansion device involves no mechanical movement other than the expansion and contraction of the

By FRANK J. OLIVER  
*Associate Editor, The Iron Age*

• • •

inclosed operating cylinder. Due to the thermal operating principle, there is a quick first response, gradually slowing down, thereby avoiding over correction and hunting. The electric metering valve is used in conjunction with a proportional throttling controller. One valve can be used in the air line and another in the gas line for mixture control, and other variations are possible.

Another type of gas control valve developed by *Wheelco* is the model 1224 modulating gas valve, a self-actuated temperature controlled valve with a remote bulb temperature element. Upon being heated or cooled within the throttling range, the temperature sensitive element actuates a double seated valve and proportions the flow of gas to the temperature demand. As the temperature approaches the upper limit of the throttling range,

to prevent blow-back, an on-off control is used. This control is for low temperature work, the maximum range being from 300 to 600 deg. F.

## Electrically Operated Valves

FOR automatic or remote control of liquids or gases, including steam up to 150 lb. per sq. in. pressure, *E. C. Atkins & Co.*, 406 S. Illinois Street, Indianapolis, is offering a line of electrically operated valves. Low current consumption is assured since the solenoid lifts a pilot valve only, the main actuating force on the valve being furnished by line pressure on a piston. There are only three moving parts on the Atkomatic valves, with no linkage between them. Non-metallic valve disks are used and other parts of the valve are bronze or stainless steel. Piston rings aid accuracy of

## BELOW

MODEL 1226 *Wheelco* modulating gas valve is governed by a remote bulb temperature element and is designed to operate as a combination on-off and throttling control to eliminate possibility of blow-backs at the upper limit of the throttling range.



## ABOVE

RATE of flow of one fluid or gas in ratio to that of a second fluid can be automatically controlled with this set of *Bristol* flow recorders and controller.



IN the *Atkins Atkomatic* electrically operated valves, the solenoid actuates only a small pilot valve, line pressure being used for opening or closing the main valve.

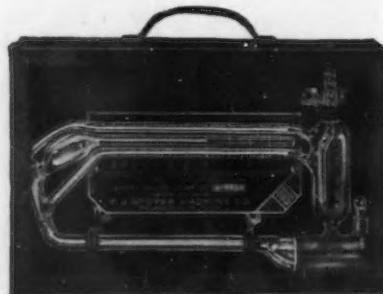


IMPROVEMENTS have been made in the Cutler-Hammer gas calorimeter which continuously determines the calorific value of fuel gas and records this value in terms of B.t.u. per cu. ft. on a visible 30-day chart.

operation and control of closing speed. These valves are made in  $\frac{3}{8}$  to 3-in. pipe sizes for pressures up to 300 lb.

#### Flow Recorder

A NEW flow recorder operating to indicate and record instantaneous values of rate of flow as measured by displacement meters has been developed by *Bailey Meter Co.*, Cleveland. This device, which employs the Bailey Synchro-Meter electrical transmitting method, differs from the usual flow recording attachment for displacement meters in that it draws a graph of rate of flow against time instead of simply recording total flow over a given time. It is attached to the displacement meter



NEW McLeod type gage for reading high vacuums, from 0 to 5000 microns (5 mm.). In this portable type of instrument, made by the *F. J. Stokes Machine Co.*, Olney P.O., Philadelphia, readings are made from the center capillary after the gage has been turned from the horizontal (evacuated) to the vertical position. A trap is provided so that the mercury cannot spill out and there is a constriction in the tubing to limit the speed of flow of mercury when the instrument is rotated from one position to another. Readings can be made in from 2 to 5 sec.

body, the register of which is raised by a filler block to afford room for bevel gears for driving the Synchro-Meter unit. This Synchro-Meter device is particularly useful when it is desired to indicate and record the instantaneous rate of flow of fluid which cannot be satisfactorily measured by orifice type meters, and may also be used as a tachometer for indicating or recording the instantaneous speed of any rotating shaft, being especially desirable for low speed (1 to 5 r.p.m.) measurements.

#### Gas Calorimeter

SEVERAL improvements have been made in the continuous measuring and recording gas calorimeter made by *Cutler-Hammer, Inc.*, 258 North 12th Street, Milwaukee. Major improve-



FYRITE is a pocket size portable CO<sub>2</sub> indicator for use in sampling flue gas from various types of furnaces. The whole kit weighs about 4 lb.



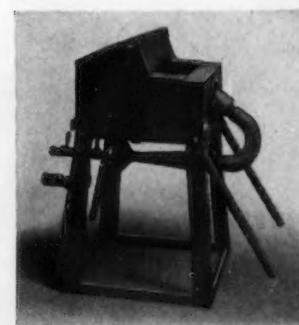
ELECTRIC dryer for drying polished metallographic specimens. Air, heated by resistance wire, is directed to top, bottom and sides of specimen, drying it in 30 sec. Motor and heater draws 500 watts. Made by the *Harry W. Dietert Co.*, 9330 Roselawn Avenue, Detroit.

ments in the tank unit result in increased speed and accuracy of response. Longer service is claimed as all underwater parts are made of brass. Idler gears have been eliminated and oilless bearings are used on all slow-moving parts. Pump and overflow weirs are non-clogging. Refinements have also been made in the recording unit which now has a new suppressed zero record chart, making variations appear greatly enlarged for greater accuracy and control of adjustments.

Chart drive is by a synchronous motor, and the entire chart mechanism swings out for easy inspection and maintenance.

#### Portable CO<sub>2</sub> Indicator

FOR measuring the percentage of CO<sub>2</sub> in flue gas, *Bacharach Industrial Instrument Co.*, Pittsburgh, has announced a new pocket size CO<sub>2</sub> indicator, called Fyrite. Made from clear plastic material, it is practically unbreakable. Operation is simple: A dozen strokes of the aspirator bulb fills the gas chamber with the flue gas to be analyzed. The sampling hose is then detached and the gas mixed with the absorption fluid by turning the instrument upside down and back again. The suction created by the absorption of the gas pulls the absorbing fluid up in the graduated tube an amount equal to the CO<sub>2</sub> absorbed, the reading be-



HAUCK Handi-Gas-Forge for rivet heating burns any gaseous fuel with Hauck high pressure air-gas booster and compressed air from 30 to 120 lb. per sq. in. pressure. Opening is 4 x 10 in. Forge weighs 187 lb. and may be carried about by the handles, shown in the down position.

ing made directly in per cent. The complete operation takes about a minute, including pumping of the gas.

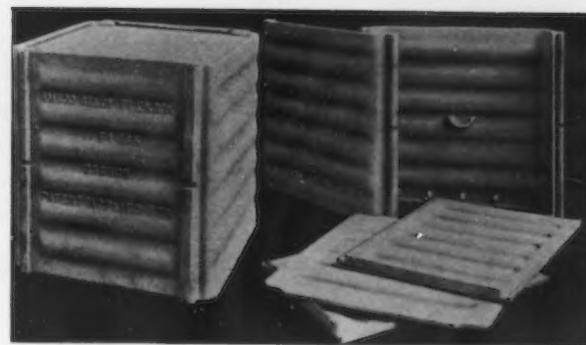
#### Heat-Treating Boxes

TO lengthen the life of boxes used for annealing, carburizing and heat treating, a new design of Amsco alloy Flexboxes in which the ends, sides, bottoms and covers are cast separately is being offered by the American Manganese Steel Division of American Brake Shoe & Foundry Co., Chicago Heights, Ill. The ends are made with vertical grooves into which fit corresponding tongues on the side castings. There is provision for holding pins to prevent relative vertical movement of the parts, but this does not hinder adequate horizontal movement and there is sufficient clearance between tongue and groove to allow for expansion and contraction. As a result, distortion and cracking from alternate heating and cooling is said to be avoided.

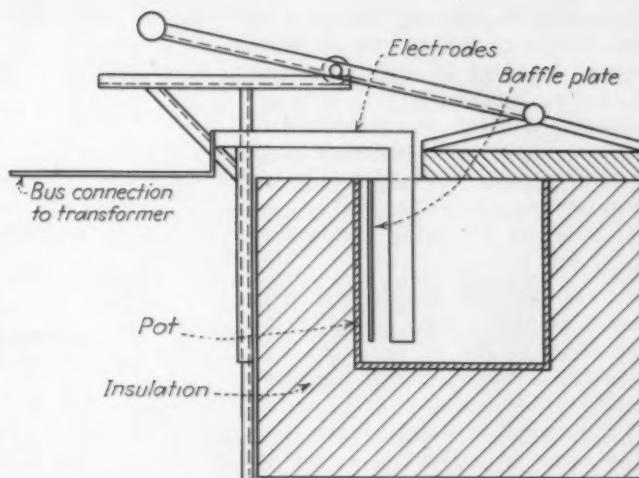
Light cast covers, corrugated or flat, with or without legs, are used to replace the oldstyle bottoms cast integral with the boxes. Special bottoms in which the edges fit into grooves in the lower edges of the end plates are available where the complete box is to be lifted when loaded.

#### Rivet Heating Forges

SEVERAL new and improved types of rivet heating forges have recently been developed by the Hauck Mfg. Co., Brooklyn. A gas-fired type is illustrated. A similar portable design for oil use carries a 10-gal. oil tank in the structural steel base. This Handi-Oil-Forge burns fuel oil of 28 deg. Baume and lighter oils with compressed air from 30 to 120 lb. per sq. in. An oil strainer prevents burner



**A**MSCO alloy Flexboxes have the ends, sides, bottoms and covers cast separately. Assembly joints are such that stresses set up by contraction and expansion resulting from rapid heating and cooling are avoided, but there is said to be no appreciable gas leakage at the vertical joints. Thinner and sounder castings result from this design.



**T**WICE the electrode life and a low rate of change in chemistry of both materials are claimed for this three-phase electrode furnace, designed by the A. F. Holden Co., New Haven. By using the electrodes in sets of three instead of in pairs, current density is 50 per cent lower. A new method is provided for preventing current passing to the pot wall and warpage of the pot wall toward the electrodes is said to be avoided, resulting in longer pot life. Cover design permits loading or unloading from either front or sides.

from clogging. Both types, which are only 30 in. in overall height, have a normal heating capacity of 350  $\frac{3}{4}$  x 3-in. rivets per hr.

A larger portable oil fired type, mounted on 7-in. diameter wheels is the new Hauck double chamber, two burner rivet heating forge. The two-muffle type heating chambers measure

13 x 9 x 6 in. each, and the combined capacity is 800 rivets per hr. The oil tank mounted in the frame is of 25-gal. capacity. In both oil types, scaling of rivets is said to be reduced to a minimum by the burner air register, and all forges are provided with an air curtain. The oil burners are of the suction type.

#### TRADE NOTES

**Van Dorn Electric Tool Co.**, Towson, Md., announces that it has opened a new branch office at 605 McCarter Highway, Newark, N. J., in charge of Harry Bullock.

**American Engineering Co.**, Philadelphia, announces that it has recently purchased the Diamond Machine Co., Providence, R. I., and will continue the manufacture of the Diamond face grinder in its Philadelphia plants.

**New Wrinkle, Inc.**, Dayton, Ohio, announces the appointment of Aktiebolaget William Becker, Stockholm, Sweden, as licensee of wrinkle finishes under the New Wrinkle patents, for Norway, Sweden and Finland.

**Westinghouse Electric & Mfg. Co.** orders in the first half of 1939 rose 36 per cent, to

reach a total of \$104,538,863, in comparison with \$76,713,806 booked during the first six months of 1938.

**Muskegon Motor Specialties Co.**, Muskegon, Mich., has purchased the former screw machine plant owned by Robert Automatic Screw Co., Jackson, Mich., and is expected to operate the plant in conjunction with its own activities.

**Cutler-Hammer, Inc.**, and the Square D Co., Milwaukee, manufacturers of electrical control equipment, both report sharp improvements in business conditions during the first six months of the current year over similar months a year previous. Cutler-Hammer reported a net profit of \$243,000 after all charges. This compares with a net loss of \$75,000 for the corresponding six months last year. Square D reported a net profit of \$308,381 for the six months' period ending June 30, as compared with \$116,328 in the same 1938 period.

**Beardsley & Piper Co.**, manufacturer of Sandslingers, Speedmullors, and Screenarators, has appointed as an agent the Independent Foundry Supply Co., 2325 East 38th Street, Los Angeles.

**The Rome Machinery Sales & Engineering Co.**, New York, announces formation of an organization headed by Norman Chester to promote the design, manufacture and sale of a complete line of modern polishing and buffing machinery and allied equipment.

**Power Piping** division, Blaw-Knox Co., announces the appointment of the George P. Schumacker Co., Cleveland, as its exclusive distributor in Ohio, for process and power piping. The Schumacker company maintains representation in Toledo, Columbus, Cincinnati, and Cleveland.

**Welding Wire Co.**, maker of woven welding wire for full shielded automatic arc welding, has moved to a new location at Broad and Walnut Streets, York, Pa.

# CRANKSHAFT WEAR COMPARED

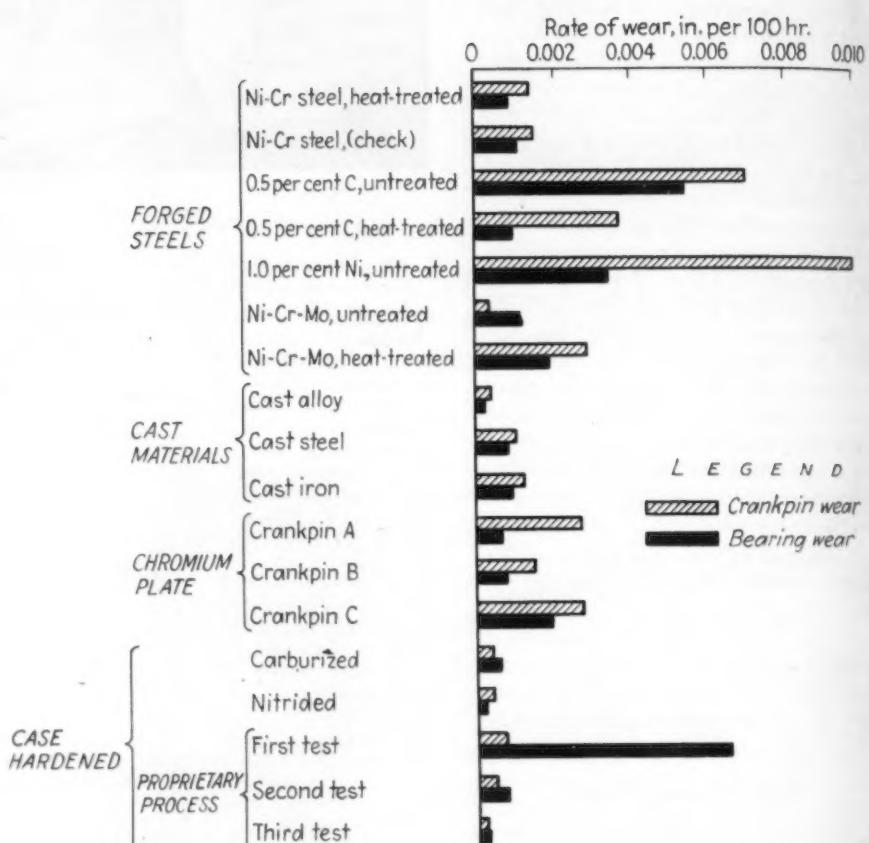
THE use of copper-lead or "lead-bronze" bearings in place of white metal bearing has eliminated the trouble of cracked bearings in automobile engines, according to C. G. Williams and H. Ludicke, of the Institution of Automobile Engineers, in a recent report before the World Automotive Engineering Congress at San Francisco. But, the use of "lead-bronze" bearings in some cases has resulted in appreciable journal wear. Accordingly, a test was conducted to determine the relative wearing properties of various crankshaft materials when running against a typical copper-lead alloy, at a bearing temperature of 212 deg. F.

In the tests the crankshafts were rotated at 3300 r.p.m., giving a rubbing speed of 756 ft. per min. The piston mass was such that the mean bearing pressure was 2500 lb. per sq. in., the maximum and minimum pressures being 4400 and 670 lb. per sq. in. respectively. A mineral oil having viscosity of 890 Saybolt sec. at 100 deg. F., and of 82.4 Saybolt sec. at the test temperature of 212 deg. F. was used throughout, the oil pressure being initially about 50 lb. per sq. in. and the oil flow 7.2 pints per hr. The bearings were assembled with a diametral clearance of 0.001 to 0.0015 in.

The bearings showed a typical analysis of between 26 and 30 per cent of lead with small additions of tin.

The crankpin materials tested, which were all ground-finished, comprised the following: A nickel-chrome steel, heat-treated; a nickel steel, not heat-treated; a nickel-chrome-molybdenum steel, both heat-treated and not heat-treated; a carbon steel, both heat-treated and not heat-treated; three cast materials; three chromium-plated materials (two not ground); and three other surface-hardening treatments, viz., carburizing, a proprietary hardening process, and nitriding.

The nickel-chrome steel analyzed 0.38 C, 0.24 Si, 0.025 S, 0.025 P, 0.53 Mn, 1.3 Ni, and 0.59 Cr. The nickel-chrome-molybdenum steel analyzed 0.365 C, 0.19 Si, 0.029 S, 0.03 P, 0.48 Mn, 2.08 Ni, 1.16 Cr, and 0.35 Mo. The nickel steel analyzed 0.365 C, 0.23 Si, 0.037 S, 0.035 P, 0.80 Mn, and 0.74 Ni. The carbon steel analyzed 0.515 C, 0.10 Si, 0.028 S, 0.028 P, and 0.63 Mn. The three cast materials



analyzed as follows: Cast "alloy," 1.2 C, 1.76 Si, 0.03 Ni, 0.55 Cr, and 2.58 Cu; cast steel, 0.3 C, 0.2 Si, 0.038 S, 0.035 P, 0.80 Mn, 2.47 Ni, 0.42 Cr, and 0.35 Mo; cast iron, 2.94 C, 1.3 Si, 0.14 S, 0.12 P, 0.95 Mn, 0.33 Mo, and 1.2 Cu.

Regarding the results obtained in this investigation, the authors gave the following data:

The wear results obtained with chromium-plated materials show that the crankpins with a relatively thick deposit gave twice the rate of wear of the crankpin having a thin deposit. When compared with the Ni-Cr steel crankpin there appears to be little advantage in using chromium-plated crankpins.

The surface hardened materials tested were: (a) a carburized crankpin with a Vickers hardness of 886; (b) a nitrided crankpin with a Vickers hardness of 1150; and (c) a crankpin hardened by a proprietary process to a Vickers hardness of 746. In the latter process it is claimed that the outer surface of the material is con-

verted into a ferrous alloy containing aluminum, silicon and chromium.

The results of tests on the surface hardened materials show that case-hardening is a satisfactory means of reducing crankpin wear with copper-lead bearings. Compared with an Ni-Cr steel, the wear with the three case-hardening processes was about one-fourth. In general, and contrary to what was observed with the softer crankpin materials, bearing wear occurred more rapidly than crankpin wear, this being due largely to high initial wear of the bearings during the early part of the tests. It is highly probable that, with hardened crankpins, surface finish of the crankpin plays a very important part in determining the amount of this initial bearing wear. In the present tests the crankpins had been ground to a fine finish which could, however, have been improved by a lapping or buffing process.

All of the experimental results obtained with the various materials are summarized graphically in the accompanying illustration.

# Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	June 1939	May 1939	April 1939	May 1938	Five Months 1939	Five Months 1938
<b>Steel Ingots: (gross tons)</b>						
Monthly output <sup>a</sup>	3,130,381	2,917,876	2,986,985	1,800,877	15,499,546	9,155,740
Average weekly output <sup>a</sup>	729,693	658,663	696,267	406,519	718,236	424,270
Per cent of capacity <sup>a</sup>	53.44	48.24	50.99	30.30	52.60	31.07
<b>Pig Iron: (gross tons)</b>						
Monthly output <sup>b</sup>	2,118,451	1,717,516	2,056,177	1,255,024	10,403,918	6,811,005
<b>Raw Materials:</b>						
Coke output <sup>c</sup> (net tons)	2,421,235	2,934,560	2,339,321	15,456,042	13,091,316	
Lake Ore consumed <sup>d</sup> (gross tons)	2,245,513	2,799,769	1,711,146	14,141,219	9,244,627	
<b>Castings: (net tons)</b>						
Malleable, orders <sup>e</sup>	27,702	29,183	17,564	164,221	94,477	
Steel, orders <sup>e</sup>	41,660	34,100	20,636	189,511	130,651	
<b>Finished Steel: (net tons)</b>						
Trackwork shipments <sup>a</sup>	6,832	6,658	6,819	2,959	27,117	18,080
Fabricated shape orders <sup>f</sup>	109,267	155,093	117,549	77,322	553,364	390,201
Fabricated plate orders <sup>f</sup>	33,959	34,036	35,844	25,141	143,078	126,400
U. S. Steel Corp. shipments <sup>g</sup>	733,433	723,165	701,459	465,081	3,659,833	2,532,297
<b>Fabricated Products:</b>						
Automobile production <sup>h</sup>	321,000*	296,000*	359,200	210,174	1,678,927*	1,116,633
Steel furniture orders <sup>i</sup>		\$1,780,024	\$1,619,218	\$1,290,469		\$8,199,113
Steel boiler orders <sup>i</sup> (sq. ft.)	1,032,339	877,117	764,996	733,678	4,206,754	2,884,516
Locomotives ordered <sup>i</sup>		51	19	5	144	44
Freight cars ordered <sup>i</sup>		2,051	2,695	6,114	7,753	6,933
Machine tool index <sup>j</sup>	211.6	219.8	155.6	66.7	186.9†	88.0†
Foundry equipment index <sup>k</sup>	134.6	108.8	146.0	90.6	133.9†	94.9†
<b>Non-Ferrous Metals: (net tons, U. S. only)</b>						
Lead shipments <sup>l</sup>	40,124	37,903	25,098	193,508	147,160	
Lead stocks <sup>l</sup>	129,270	123,394	164,636			
Zinc shipments <sup>m</sup>	37,284	39,354	40,641	24,628	208,006	125,990
Zinc stocks <sup>m</sup>	135,241	126,769	130,380	148,120		
Tin deliveries <sup>n</sup> (gross tons)	4,925	5,905	5,980	4,275	25,075	22,545
Refined copper deliveries <sup>o</sup>	63,862	63,862	46,667	33,154	266,726	183,588
Refined copper stocks <sup>o</sup>	335,012	337,155	332,513	369,809		
<b>Exports: (gross tons)</b>						
Total iron and steel <sup>p</sup>	532,641	394,008	540,628	2,123,371	2,603,644	
All rolled and finished steel <sup>p</sup>	125,545	134,478	109,448	623,505	617,154	
Semi-finished steel <sup>p</sup>	9,537	8,849	17,596	57,785	132,510	
Scrap <sup>p</sup>	382,642	237,691	371,745	1,378,694	1,624,795	
<b>Imports: (gross tons)</b>						
Total iron and steel <sup>p</sup>	28,142	44,083	20,814	144,407	103,098	
Pig iron <sup>p</sup>	3,219	3,512	1,795	11,578	19,465	
All rolled and finished steel <sup>p</sup>	13,908	32,587	15,691	89,361	68,644	
<b>British Production: (gross tons)</b>						
Pig iron <sup>q</sup>	717,700	692,100	608,900	633,900	2,921,000	3,463,900
Steel ingots <sup>q</sup>	1,175,600	1,218,100	1,058,200	957,000	5,230,000	5,149,800

† Three months' average. \* Preliminary.

Source of data: <sup>a</sup> American Iron and Steel Institute; <sup>b</sup> THE IRON AGE; <sup>c</sup> Bureau of Mines; <sup>d</sup> Lake Superior Iron Ore Association; <sup>e</sup> Bureau of the Census; <sup>f</sup> American Institute of Steel Construction; <sup>g</sup> United States Steel Corp.; <sup>h</sup> Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; <sup>i</sup> Railway Age; <sup>j</sup> National Machine Tool Builders Association; <sup>k</sup> Foundry Equipment Manufacturers Association; <sup>l</sup> American Bureau of Metal Statistics; <sup>m</sup> American Zinc Institute; <sup>n</sup> New York Commodity Exchange; <sup>o</sup> Copper Institute; <sup>p</sup> Department of Commerce; <sup>q</sup> British Iron and Steel Federation.

# THIS WEEK

## ON THE

By W. F. SHERMAN  
*Detroit Editor*

## ASSEMBLY LINE

***AFL begins campaign to invade auto industry and sends 30 organizers to Detroit . . . Dies being moved from Detroit by General Motors in attempt to prepare for 1940 models . . . Attempts to unionize shops in adjoining states seen as next step in union program . . . Production to hit low point within a week as change-over to 1940 models proceeds in other plants.***

**D**ETROIT—There is a growing realization of the significance and true import of the UAW tool and die strike against General Motors Corp.

In a meeting of presidents of 15 AFL building trade unions, in statements issued in the last week by CIO leaders in Detroit, and in some of the behind-the-scenes activity in the last few months, there are growing indications that the labor trouble currently holding up a large part of the automobile industry is nothing more than part of a gigantic battle between two unions. Moreover it has been intimated that each of the unions would like to make the General Motors strike, and incidents thereto, the occasion for organizing plants where workers haven't heretofore paid any attention to efforts of union organizers.

Attempts of the AFL to capitalize on the strike came into the open last

week when that organization launched two simultaneous programs—one to protect its interests and keep its workers on the job in the General Motors plants and the other to secure new members through the efforts of a large force of AFL organizers. A meeting of building trades union representatives of more than 1,000,000 workers was the background for the launching of the AFL drive. At this session the AFL announced that its members would continue to ignore the UAW-CIO strike, even though the CIO has already used violence to keep construction workers off General Motors projects, some of which are directly connected with the 1940 model program. An example is the General Motors Detroit transmission plant being reconditioned for use on the new models.

At the same time, the AFL sent 30 veteran organizers into Detroit and

will send many more in a move to recapture the auto industry.

Advance knowledge of AFL determination to displace the CIO in the auto industry is believed to have been passed by the ex-Martinites to the UAW-CIO. Knowledge of such strategy is reported to have had real bearing on the CIO decision to strike against General Motors. UAW-CIO union leaders have visualized a successful strike as a means of consolidating their forces and strengthening their battle lines against the AFL invasion.

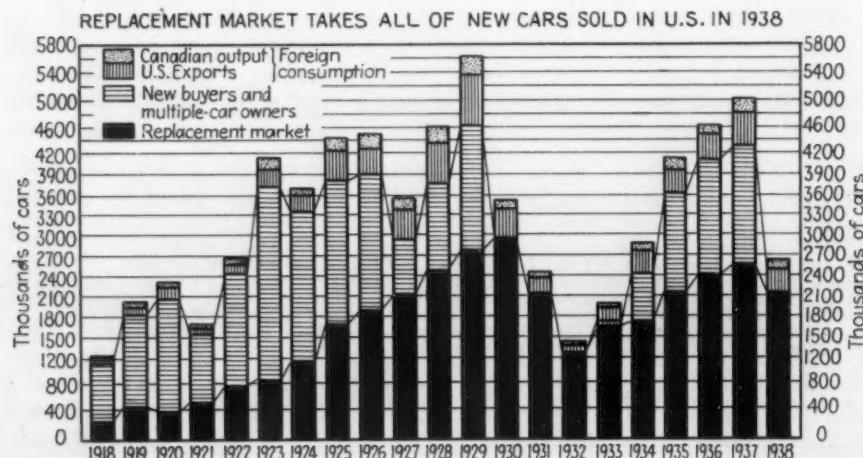
### Work Goes Out of Town

At the same time, there is another phase of the strike leaders' philosophy that hasn't been laid bare. Background information is that the CIO holds a contract with most of the Detroit tool and die shops and in the last few years has boosted labor rates far above those in adjoining states which compete for automotive tool and die work. As a result of the excessive rates in Detroit and restrictions on work output which the union has employed, great volumes of automotive work have been placed outside this city with a large loss to Detroit shops and to Detroit workmen. In other words, unionization of the Detroit tool and die industry has forced work out of town and has deprived Detroiters—employers and workmen alike—of their incomes.

The union leaders saw that their only immediate solution—and one quite to their liking, of course—was the organization of the out-of-town shops, boosting labor rates in the newly organized plants and perhaps in that way causing a shift of some of this type of work back to Detroit.

But out-of-town shops were not so easily organized. Numerous examples of medium sized die plants in adjoining states could be cited. In these places workmen turned a deaf ear to union organizers. Orders from Detroit for more work kept the out-of-town shops busy and employees on the job.

Probably many people unfamiliar with the tactics that are employed are



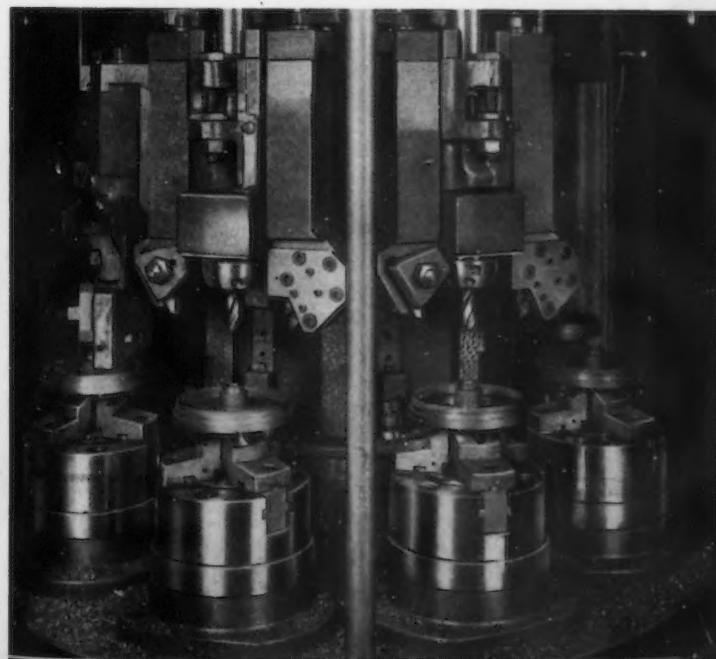
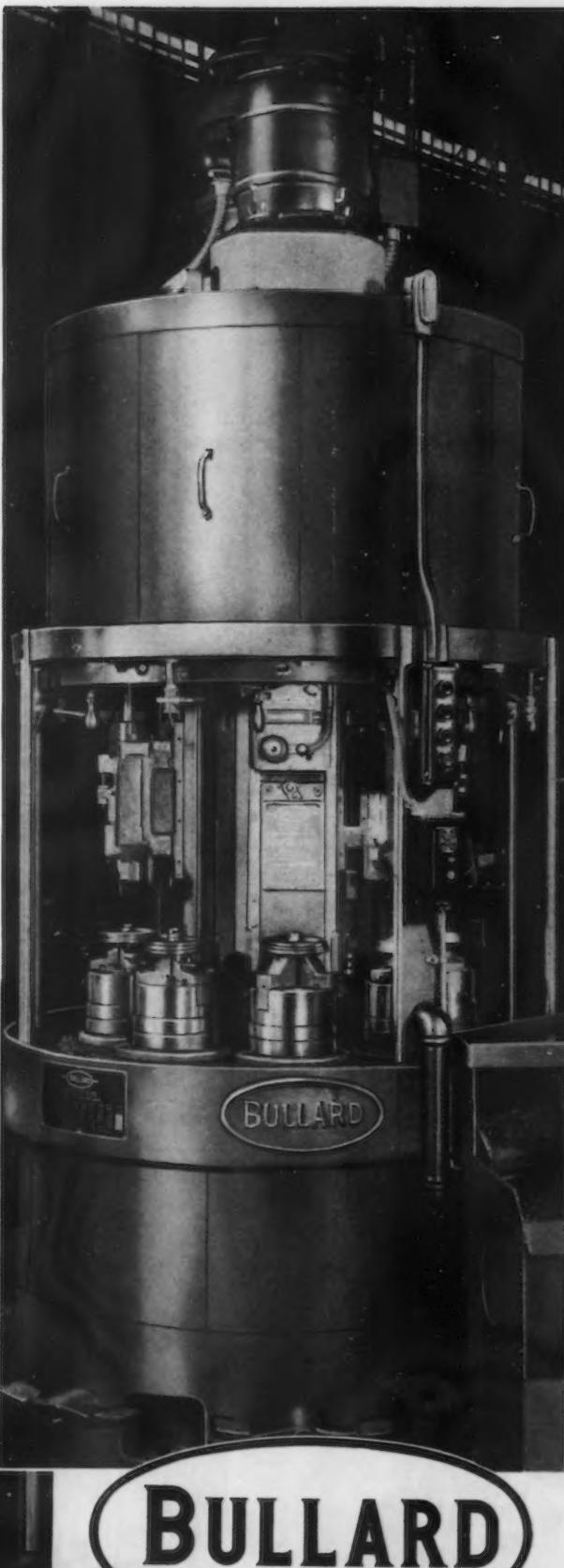
# MULT-AU-MATICS Save Money on Gear Blanks 2 Ways

The manufacturer who installed this Bullard "J-7" makes a *double saving*.

He cuts his machining time on small gears to a fraction of his former record because he applies the Mult-Au-Matic Method of individual feeds, individual speeds, and simultaneous operation—result, finished blanks in the time of the longest *individual* operation.

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not aware of what the union may gain from even an unsuccessful strike against General Motors in a case like this. But a lot of unionists are firmly convinced that if General Motors succeeds in transferring its partly finished die work to out of town shops the union will benefit. Reasoning is that every truckload of work will be followed by carloads of pickets who would follow the dies to the out of town shop and proceed to create an "incident" which would furnish organizers with a wedge.

As far as the union's practical objectives are concerned, organization of these out-of-town shops by such means would be just as effective as winning its demand for a union label on every tool, die, jig or fixture. So there is at least as much danger in moving the dies as in leaving them unfinished.

Important developments late last week include the admission that negotiations were virtually stalemated, although still going on. At the same time General Motors succeeded in its first attempt to remove the corporation's dies from one of the Detroit job shops, Frederick Colman & Sons, Inc. A skirmish began at 3 p. m. last Friday when GM sought to obtain its dies

under a writ of replevin. At one time nearly 2500 men jammed the streets around the plant while 150 or more officers attempted to maintain peace and carry out the terms of the writ. A rainstorm drove part of the crowd away and finally, early Saturday, after removal of a barricade of scrap metal four or five feet high, two trucks were loaded and moved with the unfinished dies on them.

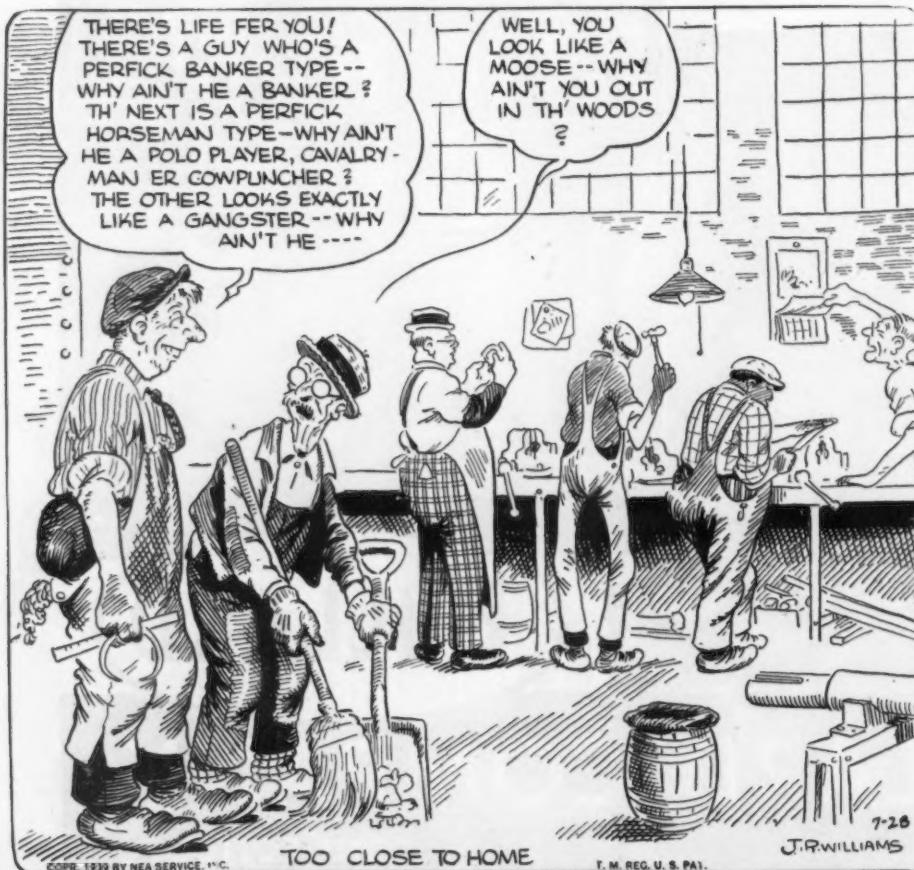
#### Low Level This Week or Next

Diminishing activity in the automobile plants on 1939 models reduced output last week to 40,595 passenger cars and trucks in the United States and Canada, from 47,420 the previous week, according to Ward's Automotive Reports. With output now running parallel to the corresponding period in 1938, when it was 31,890, the low level for the year will be this week or next.

Only three passenger car plants are still producing 1939 models. Ford was steady at 16,500 units, but Lincoln-Zephyr dropped from 500 to 375. General Motors total dropped from 18,450 to 15,030, of which 14,000 were Chevrolets. Chrysler volume was less than half of a week ago, reaching 2540 against 5900. Plymouth has ceased

#### THE BULL OF THE WOODS

BY J. R. WILLIAMS



production and is swinging over to 1940 models.

Packard's 1940 models will be distinguishable from 1939 models largely by virtue of the fact that the front end appearance has been "softened." No longer does the hood line merely intersect the grille line; a slight radius at the intersections goes a long way in the direction of smoothing up the front—although Packard's distinctive appearance is not at all lost in the change. Another noticeable difference is the fact that the radiator grille appears several inches narrower than last year. Trunk models have a fleur de lis emblem in bright chromium.

Pontiac has announced its press preview to take place at its plant on Aug. 9, the day after Packard's (See Assembly Line, July 27).

#### Non-Glare Headlamps

The twins of safety and comfort will be employed next year to sell more automobiles. It begins to look as though the industry will be able to offer customers such startling improvements in visibility, that automobile buyers will definitely react even in cases where the urge for a new car might not have proved effective. It is easy to picture a lot of night drivers, in particular, who will be so influenced by sight of the new cars, and advertising planned for them, that they will really swell the total of car registrations.

Non-glare windshields and powerful new non-glare headlamps will be the outstanding offerings of the 1940 season. The windshield development is one jointly sponsored by Fisher Body division of General Motors and Libbey-Owens-Ford Glass Co. No one knows yet exactly what is to be revealed, but these two organizations have studied the problem of glare and will announce shortly a type of windshield which will reduce glare and eye fatigue—and even back seat driving! The secret will be told within the next week, it has been stated by company officials.

Along with the non-glare windshield will be the new headlamps mentioned in the Assembly Line on July 20. It is understood that the non-glare features of these headlamps have been demonstrated to highway law enforcement bodies with such success that they will permit the use of 60 candlepower in each headlamp of the new designs. Night driving comfort and safety should be greatly improved for drivers of 1940 cars with the more powerful headlamps and the new type windshield glass.

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**CARBOLOY CEMENTED CARBIDE TOOLS**

# THIS WEEK IN WASHINGTON

*... Japan's buying from U. S., already pared to bone, unlikely to be reduced by dropping of 1911 treaty ... Lewis' name-calling of Garner brings ovation for Vice-President ... Poll shows more oppose compulsory unionization.*

By L. W. MOFFETT  
*The Iron Age*

**W**ASHINGTON — Abrogation of the 1911 treaty of trade and commerce with Japan, announced last week in a surprise move by Secretary of State Hull, may have little effect in itself upon the exportation of American scrap iron and steel, iron alloys, machinery, tin plate, petroleum, cotton and other products which Japan has been purchasing from the United States.

Despite reports of retaliatory steps, foreign trade experts who can only speculate as to what Japan will do find it difficult to believe that reprisals would take the form of curtailed purchases of commodities on which Japan has been dependent since it began its campaign in China in 1936.

Under Japan's economic program of self-sufficiency, imports have been reduced to a minimum so that exports to Japan in the past year probably come close to representing bare necessities which that country could do without only with difficulty. The present outlook, while subject to change, is that so far as Japan is concerned, American exports will continue at about the rate obtaining in 1938 even after the treaty is terminated six months hence. There is of course the possibility that Japan may attempt to divert purchases elsewhere but so far as scrap iron is concerned there are few if any other markets to which she can turn. Machine tools, it is pointed out, could possibly be bought from Germany but neither that country nor Great Britain is in a position to export. These and most other machine-producing countries are concentrating on production for domestic use.

Cotton, scrap iron, petroleum, iron alloys, machinery, automobiles and airplanes are the major products which Japan has been buying recently from this country. Exports of iron and

steel scrap to Japan reached a high of \$39,386,000 in 1937 and decreased to \$22,061,000 last year. Exports of iron alloys in 1938 were valued at \$21,813,000; metal-working machinery, \$23,811,408, of which \$18,692,920 represented machine tool exports; tin plate, \$1,649,000; automobiles and parts, \$10,142,000; airplanes and parts, \$11,062,000. Approximately 485,000 tons of iron and steel products valued at \$15,510,197 went to Japan from this country in 1938.

Japanese imports from the United States during 1938 declined to the lowest level since 1934. The Commerce Department attributes this 28 per cent decline to lower commodity prices, particularly on scrap iron and raw cotton, and to the restrictions imposed on imports. Custom figures show that there was a sharp decrease from 1937 in Japan's purchases last year of American metals and manufactures, automobiles and parts; but substantial increases were noted in machinery, petroleum products, aircraft and aircraft parts.

## Restrictions Unlikely Now

However, if a recent three-year program for attaining a higher degree of self-sufficiency is successful in the production of basic commodities in Japan proper, in Manchuria and North China, it is possible that American exports on some items may be curtailed by the Japanese. This program is aimed particularly at developing by 1942 greater resources of iron and steel materials, non-ferrous metals, machine tools, rolling stock, and motor vehicles. But aside from this long-range effort it is believed that Japan can ill afford to further restrict imports from the United States.

On the other hand, abrogation of the treaty opens the way for Congress in

January to pass the so-called Pittman resolution under which this country could restrict or prohibit exports of arms, ammunition and implements of war, as defined under the present neutrality law, as well as "iron, steel, oil, gasoline, scrap iron, scrap steel and scrap metal containing a combination of iron and steel and other metals or any combination of metals."

## Scrap Licensing Possible

Senator Key Pittman, chairman of the Senate Foreign Relations Committee, deferred action on his resolution two weeks ago when some Congressional members became dubious that its passage would be in violation of the 1911 treaty. Mr. Pittman sought an opinion from the State Department, but an answer was postponed until January. Failure of the Secretary of State to give an immediate reply made the announcement of treaty termination even more surprising.

Superficially, the abrogation seems to indicate that the Administration would support the Pittman resolution and that perhaps the State Department is ready to withdraw its opposition voiced two years ago to the proposal for licensing scrap exports. It is pointed out, however, that the treaty continues in effect for six months at the end of which time circumstances may have changed. If the announcement of intent to terminate the treaty is classified as one of the economic measures short of war to which the President has referred, and if the action turns out to be effective, the Administration may be satisfied to take no further action.

## Rail Equipment Exports Under 1938 Level

**W**ASHINGTON—Exports of railway equipment, including locomotives and parts, rolling stock, railroad signals, car heating and air brake equipment, were valued at \$3,809,744 during the first six months of 1939, according to Commerce Department figures announced last week. This represented a \$4,698,327 decrease below the first six months in 1938. The department reported that exports of railroad equipment in June this year totaled \$860,468 compared with \$614,453 in May. Shipments of railroad equipment to non-contiguous countries in June showed a slight increase over those in May.

# *believe it or not* IT'S THE SAME SHOP!

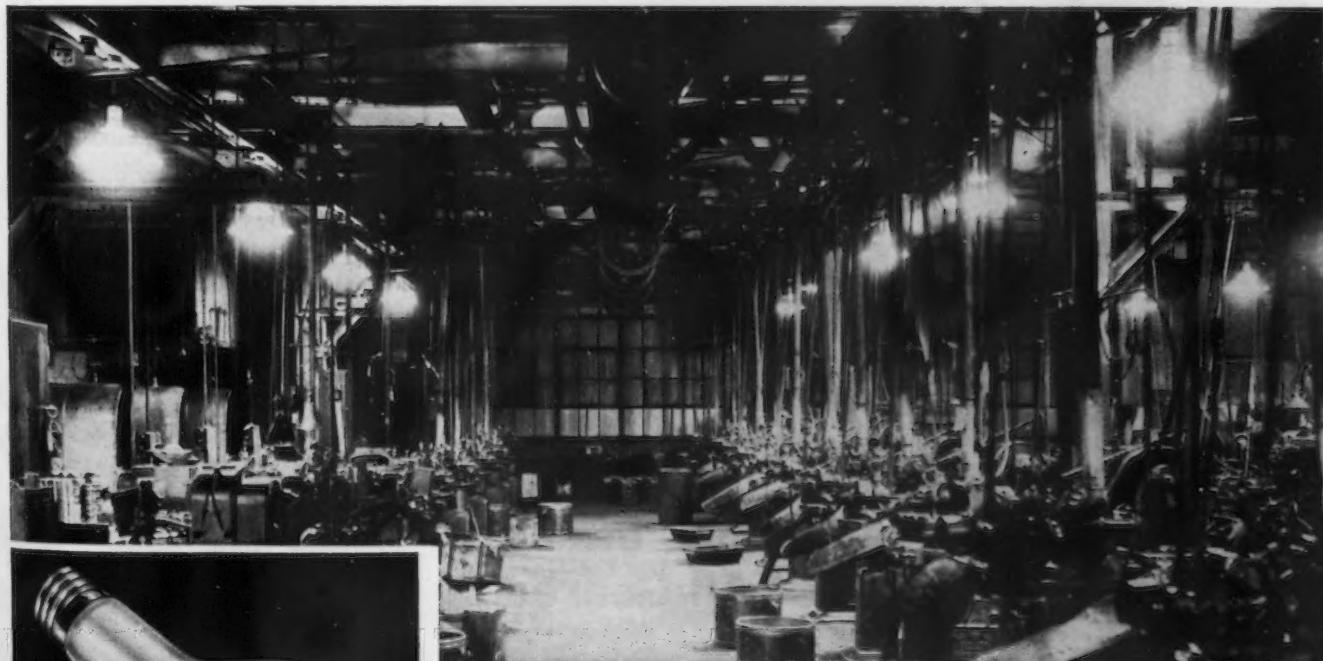


**BEFORE** the Aetna Ball Bearing plant in Chicago installed modern lighting, a Light Meter check-up revealed insufficient light and spotty distribution of light for easy seeing. This was caused principally by poor spacing and mounting of fixtures and the use of wrong size lamp bulbs.

Light Sensitive Cell



Ask your electric service company to measure your lighting with one of these G-E Light Meters.



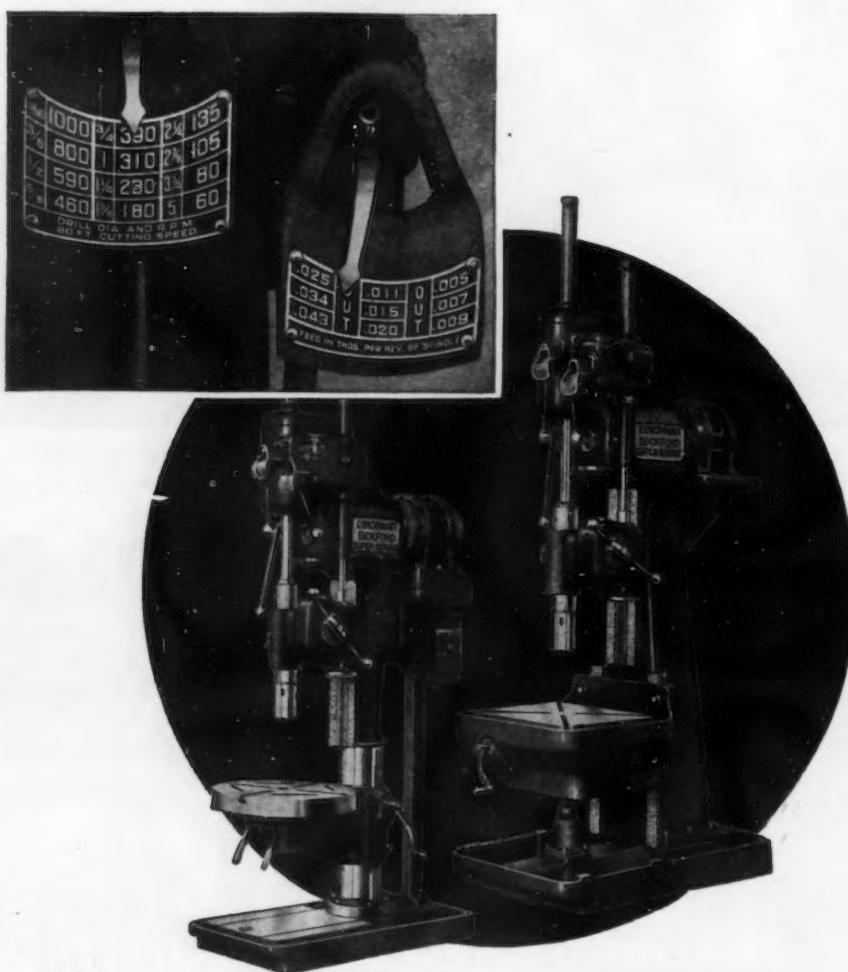
**AFTER** the plant was light-conditioned, seeing conditions were greatly improved. Present installation includes Glassteel Diffusers spaced on 12-foot centers, each equipped with a 300 watt G-E MAZDA lamp, the kind that stay brighter longer.

**G-E MAZDA LAMPS**  
**GENERAL ELECTRIC**

## Spend-Lend Bill Provisions Thrown Out By Economy Bloc

**W**ASHINGTON—Provisions in the spend-lend bill for making \$350,000,000 available for Government purchase and lease of railroad equipment and for lending \$500,000 for the construction of toll roads, bridges and tunnels were thrown over-

board by the Senate last week as a strong bi-partisan economy bloc, increasing Congressional independence, and the inevitable urge for adjournment, combined to threaten all phases of the New Deal's pre-election pump-priming formula. Other changes were



### **MORE HOLES PER DOLLAR from SUPER SERVICE UPRIGHTS 21" 24" 28" All Geared**



A wide range of useful drilling speeds and feeds, instantly available by direct reading single lever control, promotes rapid and efficient operation. Write for Bulletin U-22 giving full particulars.

**THE CINCINNATI BICKFORD TOOL CO.**  
OAKLEY CINCINNATI OHIO U.S.A.

in the offing on the House side and ultimate defeat of the measure was not beyond the realm of possibility.

Leading the opposition on the railroad equipment proposal, for which the railroads have shown no enthusiasm, was Senator Wheeler, Democrat of Montana, who declared that never in the history of the Senate has there ever been "a more loosely drawn provision than the section giving the RFC the power to make contracts and negotiate with railroads and to turn equipment over to them." He characterized the proposal as "impossible of administration" and warned that the Government would never get its money back.

The Senate Committee on Interstate Commerce, of which he is chairman, has studied the problem of railroad financing for the last three years. "There was never the slightest intimation of this proposal brought to the attention of any member of our committee," Wheeler continued. "We were never consulted about it in any way, shape or form, and I am sure that every member of the committee who knows anything about it would have been unanimously against a proposition of this kind, because we know what has been going on in the way of financing on the part of some of the railroads, and we also know of the tremendous losses which have already been sustained by the Reconstruction Finance Corp."

The Senator's remarks, coinciding with testimony given the Senate Banking and Currency Committee when the spend-lend bill was under consideration, pointed out that the railroads today can buy equipment on the installment plan. Senator Tobey, Republican of New Hampshire, concurred, insisting that "equipment bonds go like hot cakes without the Government acting in the capacity of a wet nurse in the matter." It was Wheeler's forecast that if equipment were leased to the railroads the Government would be lax in keeping it in repair and would be in litigation with the roads for the next 20 years. The final vote to drop the railroad equipment section of the bill was 45 to 32.

#### **Toll Bridges Unpopular**

The provision for building self-liquidating toll roads, bridges and tunnels was similarly chopped off the measure in a 42 to 38 vote. Before the Senate voted for the Byrd amendment to drop the highway provision, Senator McKellar, Democrat of Kentucky and chairman of the Senate Post Office and Post Roads Committee, reminded his colleagues that toll roads

and bridges are about as unpopular as any public work ever undertaken. When once constructed, he told the Senate, one of first things that follows is the introduction of a bill to do away with the tolls. He called the toll road provision "unwise" and cautioned members that highways built under the plan would have little chance of being self-liquidating.

Doubt was expressed by some Senators that the benefits of the highway provision could be applicable to more than the seven or eight states which have constitutional provisions permitting the acquisition of excess property by condemnation. By the time the proposal was voted down, many of its features had been shot with holes despite the plea by Majority Leader Barkley, who has had his hands full in recent weeks with recalcitrant members, that "this is one of the important sections of the bill."

#### Bill Called "Fraud"

The proposed self-liquidating program, renamed a program for financing recoverable expenditures by Senator Barkley, faced stiff opposition from Democrats and Republicans alike in four succeeding day and night sessions. Senator George, Democrat of Georgia and successful candidate for reelection even after being marked to "go" in the purge, called the bill "a palpable fraud" and other members inferred that only top-soil thinkers and economic illiterates could approve all of the features proposed in the measure.

Even Senator O'Mahoney, Democrat of Wyoming, who as chairman of the Temporary National Economic Committee, has been classified as the instigator of a business witch-hunt, successfully sponsored an amendment designed to prevent Government interference with existing private enterprise. Prohibiting any of the \$350,000 proposed for public works loans from going into a project in any field which private industry already is serving adequately, the O'Mahoney amendment was believed in some quarters to be broad enough to prevent the construction, for example, of an electric power plant in a section already served by a utility.

#### Lea Measure Passed

Earlier in the week the House passed the Lea transportation bill which would bring inland waterway carriers under jurisdiction of the Interstate Commerce Commission, extend various methods of financial assistance to the railroads, and permit the roads instead of the ICC to

originate steps for consolidations and mergers. The Senate passed a similar bill late in May, exempting iron ore and coal carriers on the Great Lakes and leaving unchanged the present commodity clause, but differences between the two drafts make it impossible for conferees to reach an agreement this late in the session. In the words of Chairman Wheeler, of the Senate Interstate Commerce Committee, the bill is dead for this session; but a compromise proposal may be

agreed upon during the congressional recess and laid before Congress in January.

The Senate Interstate Commerce Committee also reported favorably a resolution by Senator Wheeler directing the ICC to study the so-called Hastings plan for "postalization" of railroad rates. The plan involves the establishment of 10 inter-urban areas 250 miles apart, within which passenger rates would be fixed at low rates.

## The Elwell-Parker *NEW* Center Control Trucks are ready in five different models



*and that means:—5 separate CAPACITIES ranging down from 8,000 to 2,000 pounds... 5 different WHEEL-BASE lengths and widths... 5 different sizes of power plants—your option of power*

*All are equipped with the same improved Lift, Hoist and Drive Units used on other Elwell-Parker Models.*

*In addition, Elwell-Parker builds 5 corresponding Models of Rear-Control Trucks, all newly designed—thus providing 10 modern Trucks from which you can select one or more exactly meeting your operating conditions and creating largest permanent savings for you. Elwell-Parker goes all the way!*

**Special Benefits:**—Elwell-Parker New Center-Control Trucks bring the operator nearer the pay load—insure greatest

visibility, greater safety—assure speedier handling and the easiest of maneuvering in close quarters. Optional attachments: Forks, Rams, Lifting-Tilting-Tiering, or others you may require.

Elwell-Parker Representatives give first, Engineering and Application Counsel—sales advice afterward. So, the Elwell-Parker Truck or System you buy is right for your particular use—will earn greatest profits for you.

Wire today—COLLECT. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

**ELWELL-PARKER Power Industrial TRUCKS**

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

# Garner a Poker-Player and Whiskey-Drinker, Lewis Reports

**W**ASHINGTON — John L. Lewis, CIO chairman, is back in the limelight after having made an attack upon Vice-President Garner whom he accused of trying to knife "the quivering, pulsating heart of labor." After the name-calling episode, which occurred before a House Labor Committee during its consideration of badly snarled amendments to the wage and hour law, the Vice-President, who is currently enjoying a build-up as a Presidential candidate, only chuckled.

Mr. Garner's friends were quick to defend him against the CIO leader's statement that the Vice-President is a "labor-baiting, poker-playing, whisky-drinking, evil old man."

The Lewis statement, which said that the Vice-President will never become President "by baiting labor and seeking to debase Americans," was immediately interpreted as a big boost for Garner's Presidential aspirations.

Ovations for the Vice-President followed in both houses, and Senator Tydings, Democrat of Maryland and successful candidate for reelection in last year's purge campaign, countered with an amendment to the spend-lend bill designed to prohibit any organization from making political contributions.

Obviously referring to the \$470,000 loan made to the Democratic party by the Lewis' United Mine Workers in the 1936 campaign, the Senator said his proposal would "cover the case where the Democratic party borrowed a half million dollars."

Earlier in the week the CIO generalissimo announced that the CIO would organize a new industrial union among the 3,000,000 wage earners in the building construction field—a move that appeared likely to widen the rift with the AFL, which has long dominated that field.

To be known as the United Con-

struction Workers Organizing Committee, the new CIO offspring will be headed by the CIO chieftain's brother, A. D. Lewis and Philip Murray, chairman of the SWOC.

## Government Steel Orders for Week

**W**ASHINGTON—Government contracts for iron and steel products, as reported by the Labor Department's Division of Public Contracts for the week ended July 22, totaled \$2,044,429. For the same period, contracts for non-ferrous metals and alloys amounted to \$162,179, and for machinery, \$1,180,883. Details follow:

### Iron and Steel Products

Keystone Steel & Wire Co., Peoria, Ill., nails, steel	\$10,779.00
Bethlehem Steel Co., Bethlehem, Pa., forgings, steel	180,120.00
The Midvale Co., Nicetown, Philadelphia, forgings, steel	21,574.00
Northill Co., Inc., Los Angeles, anchors	13,713.60
Storms Drop Forging Co., Springfield, Mass., forgings	10,412.70
Strong Steel Foundry Co., Buffalo, steel castings	34,369.33
Bethlehem Steel Co., Bethlehem, Pa., steel castings	17,334.50
National Can Corp., New York City, cans and pails	11,615.00
Michigan Seamless Tube Co., South Lyon, Mich., tubing, steel	11,944.29
Lynchburg Foundry Co., Lynchburg, Va., pipe and fittings	33,993.61
U. S. Pipe & Foundry Co., Philadelphia, water pipe	125,419.91
Republic Steel Corp., Massillon, Ohio, steel	10,974.76
Bethlehem Steel Co., San Francisco, steel bars	18,462.26
American Rolling Mill Co., Middletown, Ohio, strip steel	18,061.79
Eastern Rolling Mill Co., Baltimore, steel	23,692.24
The Kirk & Blum Mfg. Co., Cincinnati, ranges	225,179.20
Consolidated Steel Corp., Ltd., Los Angeles, slide gates	97,000.00
Blaw-Knox Co., Pittsburgh, antenna towers	93,500.00
Blaw-Knox Co., Pittsburgh, Pa., antenna towers	86,400.00
Pines Winterfront Co., Chicago, fin assemblies	10,123.10
Bay State Tool & Mch. Co., Springfield, Mass., chests, water	10,300.00
The Astrup Co., Cleveland, rings: slips, tent	12,460.44
Bethlehem Steel Export Corp., New York City, and Leetsdale, Pa., parts for debris rafts	786,880.40

### Non-Ferrous Metals and Alloys

Aluminum Products Co., LaGrange, Ill., inserts	\$31,310.45
Aluminum Cooking Utensil Co., New Kensington, Pa., filters, coffee	11,261.89
Scovill Mfg. Co., Waterbury, Conn., cartridge brass cups	35,250.00
The American Brass Co., Waterbury, Conn., copper rotating bands	21,059.59
Pennsylvania Smelting & Refining Co., Philadelphia, lead	24,590.72
International Nickel Co., Inc., New York City, nickel-copper, etc.	12,125.88
Metro Smelting Co., Philadelphia, lead antimony	14,730.00
The American Brass Co., Waterbury, Conn., tubing, copper-nickel	11,851.06

### Machinery

Ingersoll-Rand Co., Painted Post, N. Y., air compressors	\$21,600.00
James Leffel & Co., Springfield, Ohio, turbines and governors	68,828.00
Worthington Pump & Machinery	

LEE SPRING COMPANY, Inc.  
30 MAIN STREET

BROOKLYN, N.Y.

LEE-BUILT  
TRADE  
MARK  
SPRINGS



DEVELOPMENT of new plastic materials, new processes involving the separation of gases; control of reaction speed and other important features are opened up to refiners by artificially stimulated sub-zero temperatures.

To take advantage of these new processes, metals must be employed that retain strength and toughness at the sub-zero temperatures (generally  $-150^{\circ}$  F.) involved.

The proved stability and toughness of Nickel alloy steels, either cast or wrought, offers unique advantages to refinery operators. Wherever problems of temperature, corrosion or wear arise safeguard your operation—and your operating costs—by specifying the right Nickel alloy. For information on new uses of Nickel in refineries, please address:

**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.**

These valves control flow of hydrocarbon gases at pressures up to 600 lbs. and temperatures down to  $-150^{\circ}$  F. Cast of 4.00% Nickel alloy steel by General Metals Co., Oakland, for Merco Nordstrom Valve Co., Oakland, to pass hydrostatic test of 1,000 p.s.i. After normalizing at  $1800-1850^{\circ}$  F., these valve bodies were oil quenched from  $1550^{\circ}$  and drawn at around  $1200^{\circ}$  to develop tensile strength of 107,000 p.s.i. Charpy impact, key-hole notch, test showed 20 ft. lbs. at  $-150^{\circ}$  F.

Compare!

- density
- trim
- bearings
- workmanship

These are the factors that give you, in Pittsburgh Plate Glass Company's Spiral Wound brushes, the "right" brush for your use—equipment designed to best take care of your needs.

Write or wire to-day for our engineering representative. He will gladly work with you in developing Spiral Wound brushes of wire, horsehair or tampico, to meet your particular finishing requirements.

PITTSBURGH  
PLATE GLASS COMPANY  
BRUSH DIVISION  
BALTIMORE  
MD.

Corp., Buffalo, N. Y., compressors, air	21,196.00
Gisholt Machine Co., Madison, Wis., lathes, turret	36,033.00
The Warner & Swasey Co., Cleveland, lathes, turret	22,526.40
Stedfast & Roulston, Inc., Boston, drilling machines	11,732.00
H. R. Krueger & Co., Detroit, milling machine	17,000.00
Austin-Hastings Co., Inc., Cambridge, Mass., lathe	10,415.00
The G. A. Gray Co., Cincinnati, machine, milling	41,961.00
The American Tool Works Co., Cincinnati, lathe, engine	50,167.00
Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., shaper	14,275.00
Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., boring machine	14,697.00
The Heald Machinery Co., Worcester, Mass., grinders	15,022.00
Jones & Lamson Machine Co., Springfield, Vt., grinding machine	16,788.00
Brown & Sharpe Mfg. Co., Providence, R. I., screw machines	33,758.00
Cleveland Automatic Mch. Co., Cleveland, screw machines	11,095.00
The E. L. Essley Machinery Co., Chicago, honing, lapping and polishing machines	100,770.00
Cleveland Automatic Machine Co., Cleveland, screw machines	12,767.00
Jones & Lamson Machine Co., Springfield, Vt., turret lathes	46,752.00
Kearney & Trecker Corp., Milwaukee, Wis., milling machines	27,159.60
Gisholt Machine Co., Madison, Wis., lathe, turret	12,094.00
Brown & Sharpe Mfg. Co., Providence, R. I., machines, automatic screw	32,050.80
Wm. Sellers & Co., Inc., Philadelphia, machines, boring, drilling	93,339.00
Intertype Corp., Brooklyn, N. Y., machine, typesetting	13,006.88
Harris Seybold Potter Co., Cleveland, printing presses	69,875.00
De Laval Steam Turbine Co., Trenton, N. J., pumps	13,805.00
Montgomery Elevator Co., Moline, Ill., elevators	15,524.00
Pangborn Corp., Hagerstown, Md., equipment, sand blast	12,497.00
Proctor & Schwartz, Inc., Philadelphia, drying units	40,950.00
Cherry-Burrell Corp., Baltimore, Cedar Rapids, Iowa, and Ft. Wayne, Ind., pasteurizers	13,087.13
Crane Co., Chicago, Ill., valves	42,300.00
Leach Co., Oshkosh, Wis., reel unit	227,812.92

#### Navy Department Awards Contracts

**W**ASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded an \$80,853 contract to the Kutztown (Pa.) Foundry & Machine Corp., for chairs for rail tracks; a \$68,074 contract to the Rust Furnace Co., of Pittsburgh, for one stress relieving furnace; and a \$33,307 contract to the Standard Transformer Co., of Warren, Ohio. Other orders announced at the same time went to these companies:

Brown & Sharpe Mfg. Co., Providence, R. I., \$26,915 for hand screw machines; Bethlehem Steel Co., Bethlehem, Pa., \$19,881 for rivet steel; Crescent Tool Co., Jamestown, N. Y., \$8,406 for nippers and pliers; Treadwell Engineering Co., Easton, Pa., \$7,000 for services to finish machine castings; Kearney & Trecker Corp., Milwaukee, \$8,768 for one milling machine; Ladish Drop Forge Co., Cudahy, Wis., \$15,912 for forgings, plunger; and the Atlas Car & Mfg. Co., Cleveland, \$18,177 for one locomotive.



Greater Tonnage  
Per Edge of Blade



AMERICAN  
SHEAR KNIFE CO.  
HOMESTEAD, PENNSYLVANIA

## Machinery Exports Taper During June

WASHINGTON—Commerce Department figures showed this week that exports of industrial machinery in June, valued at \$22,573,175, were 3 per cent below the corresponding figure for the same month in 1938.

The decline registered in the power-generating machinery (except electrical and automotive), power-driven metal-working, and mining, well, and pumping machinery groups were almost entirely offset by substantial gains in all other types including textile, and construction and conveying equipment, the department reported.

Through June, machinery shipments abroad this year totaled \$141,384,366, showing little change from the comparable trade figure for January-June 1938 of \$142,216,348. The groups showing increases in the first half of 1939 were power-driven metal-working, textile, sewing, and shoe, and miscellaneous types of industrial machinery, while declines were recorded in power-generating, construction and conveying, mining, well, and pumping, and metal-working (other than power-driven) equipment.

### Overseas Shipments Greater

Most types of construction and conveying machinery shared in the sharp upswing in overseas consignments in June to \$2,558,330, compared with \$2,047,131 a year ago but June exports of power-driven metal-working machinery declined 27 per cent from \$3,000,189 in June, 1938, to \$6,660,447 in June this year. Increases were recorded for thread-cutting and automatic screw machines; surface grinding machines; internal grinding machines; tool, cutter and universal grinding machines; and other grinders and parts. Decreases were reported for lathes; vertical boring mills and chucking machines; milling machines; gear cutters, planers and shapers; external cylindrical grinders; sheet and plate metal-working machinery; forging machinery; and rolling-mill machinery.

Overseas shipments of metal-working machinery, other than power-driven, were valued at \$403,905 during June, 26 per cent greater than the comparable exports last year.

**Midland Steel Products Co.**, Cleveland, auto parts maker, reports net profit for the second quarter of \$540,966, as compared with \$162,815 in the June quarter of 1938. For the half-year, net profit was \$1,017,377, or three times greater than the profit of \$334,696 reported in the first six months of 1938.



## Grinding and Milady's Hose

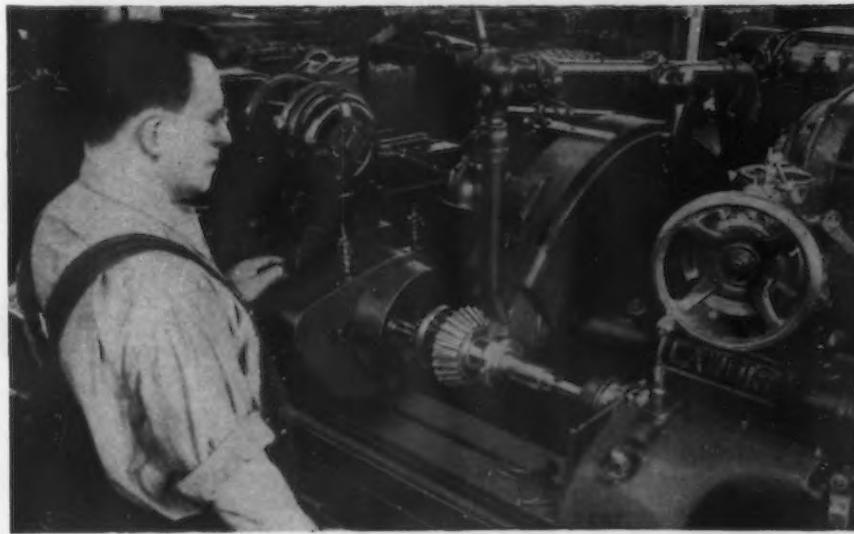
The grinding machine contributes to modern living more than is suspected by many.

Below is one in the plant of a large textile machine manufacturer. The entire output of this Landis Plain Hydraulic is used in machines employed for the making of ladies full fashioned silk hosiery. This manufacturer, because of the greater precision of his ground parts, is now able to offer a better product and therefore a more salable product.

Look into the possibilities of modern grinding as done by Landis if any of your manufacturing operations require the accurate finishing of metal. A Chocolate bar manufacturer did this. So did a metal lath manufacturer and a linseed oil producer. They, like the textile machine manufacturer, invested and have received substantial dividends ever since.

*Your need may be just as great as theirs was.*

**LANDIS TOOL COMPANY**  
WAYNESBORO, PENNSYLVANIA



# Public Opposes Compulsory Unionization, Poll Shows

WASHINGTON—An increase in public sentiment against the arbitrary forcing of workers to join unions is shown in results of a nation-wide survey by the National Association of Manufacturers.

The association in commenting on the poll stressed that it did not "represent public opposition to unions or

the right of workers to organize, but does show public emphasis on voluntary membership rather than the tactics used to make membership compulsory."

The question propounded on compulsory unionization was: "Should every worker be forced to join a union?" These were the results as

compared with the responses to the same question two years ago:

	1937	1939
No .....	57%	61%
Yes .....	23%	20%
Sometimes .....	9%	11%
Don't Know .....	11%	8%

"Interesting is the fact that a breakdown of the replies reveals that there has been a decided swing in the factory workers opinion," the association commented. "It has been in the factory that the greatest high pressure efforts at unionization have been made."

Here is the way the factory workers answered the question of whether every worker should be forced to join the union:

	1937	1939
No .....	40.7%	50.7%
Yes .....	42.9%	28.4%
Sometimes .....	9.3%	14.2%
Don't Know .....	7.1%	6.7%

The following are the results of the answer to the question, "Who has done most for the United States in the last 10 years?":

Manufacturers .....	24%
Industrialists .....	14%
Merchants .....	11%
Bankers .....	10%
Labor Leaders .....	9%
Political men .....	7%
Social Reformers .....	6%
Don't know .....	32%

(Total aggregates over 100 per cent because some persons cited more than one group).

Commenting on these results, the association said:

"It is significant that the custodians of the private enterprise system, the manufacturers, industrialists, the merchants and the bankers gathered 59 per cent of the entire vote, six times as many votes as the labor leader, over eight times as many as political men and ten times as many as social reformers. Compared to a similar question in 1937, manufacturers have stayed in first place and have increased their lead slightly, political men have dropped from second to sixth, and bankers have come from last to fourth place."

The following represents the changes in public opinion on this question today as compared with 1937: The favorable public attitude toward bankers increased 5.3 per cent as compared with 1937; the attitude toward merchants and manufacturers increased 2 per cent for each; for industrialists 0.7 per cent while social reformers, labor leaders and politicians lost a total of 13.2 per cent in the public's favor.

**Combining Stamping and Welding**

lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.

The channel of this inclinator frame is pressed steel 3' deep and  $\frac{1}{8}$ " thick. The lugs and bosses are welded in place.

Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.

**PARISH PRESSED STEEL CO.**  
Reading, Pa.

PACIFIC COAST REPRESENTATIVE  
F. Somers Peterson Co., 57 California St.  
San Francisco, Cal.

**PARISH**  
Specialists in  
STAMPINGS  
of Distinction

## June Steel Exports Climb 28½ Per Cent

WASHINGTON—Increasing by 28.5 per cent, June exports of iron and steel, as reported by the Commerce Department, totaled 189,968 gross tons compared with 147,760 tons in May. June exports were valued at \$13,789,887, May exports at \$11,661,926. The 923,275 tons exported in the first six months of 1939 represented a 17 per cent reduction below the 1,117,434 tons exported during the comparable period in 1938.

Canada continued to be the chief country of export, receiving a total of 21,854 tons made up primarily of structural shapes, non-alloy black steel sheets and tin plate. Exports to Sweden came next, amounting to 19,276 tons consisting of non-alloy "other" plates, tin plate, plain shapes and pig iron. The Netherlands was third with 12,546 tons comprising non-alloy "other" plates, and tin plate.

Tin plate exports, the Department said, were high in June with 25,718 tons being distributed principally to the Netherlands, Sweden, Brazil and Canada. Non-alloy "other" plates were not far behind with 25,507 tons going mainly to Sweden, the Netherlands, the Union of South Africa and Mozambique. Non-alloy black steel sheets likewise ranked high with 20,137 tons, the largest single shipment going to Canada.

Scrap shipments continued at a high level, increasing from 384,881 tons in May to 398,888 tons in June. Japan remained the leading purchaser, taking 178,462 tons, a decrease below the 196,686-ton figure for May. The United Kingdom bought 80,560 tons; Italy, 50,662 tons; Canada, 37,489 tons; Poland and Danzig, 29,615 tons.

For the first six months this year scrap exports amounted to 1,788,952 tons as compared with 1,798,313 tons in the same period last year.

## ICC Approves Building Of 50 Welded Tank Cars

WASHINGTON—An application for the construction of 50 tank cars to be fusion-welded by the General American Transportation Corp., of East Chicago, Ind., has been approved for test purposes by the Interstate Commerce Commission. To be built for the transportation of caustic soda solution, the cars are in addition to about 250 now in use and on which the ICC is making service tests.

Information filed with the ICC indicates that corrosion occurs at the rivets of stainless-steel tanks whereas if fusion welded, the tanks can be constructed of nickel-clad plates or, as is planned for the 50 cars just ordered, the inner surface can be painted to reduce corrosion to a minimum.

The commission also has approved an application for the construction of 10 test cars for carrying petroleum products to be built by the American Car & Foundry Co., New York. Construction of test cars of various de-

scriptions has been going on since 1934. After approval by the ICC, the cars can be put in service commercially.

## Pittsburgh Steel Co. Loss Is Reduced

PITTSBURGH STEEL CO.'S net loss of \$232,615 for the quarter ended, June 30, compares with a net loss of \$377,159 in the first quarter of this year. Net sales were \$6,061,970 against \$5,573,841.



# FOR SHOCK LOAD PROTECTION — STEEL PICKS PENOLA

When red-hot sheet steel hits the rollers...that's when *real* shock load begins! And the roll-neck bearing (that cost you perhaps ten thousand dollars) is at the business end of that terrific pressure. Will the bearing hold up? It will...if you've lubricated with Penola!

Today you make fewer passes and deeper drafts...and you have to rely on a lubricant that offers an extra margin of safety to protect against these

increased shock loads. *Penola is that lubricant!*

The men in charge of 80% of all 4-high mills specify Penola! And Penola makes and sells more steel mill lubricants than any other maker in the world. Penola means Profit on your Company's books!

### PENOLA LUBRICANTS

Penola Inc., Pittsburgh, Pa.

(Formerly Pennsylvania Lubricating Co.)  
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

# Programs Completed for Machine Tool Congress

CLEVELAND—The schedule of programs of the organizations participating in the Machine Tool Congress, to be held here in October in conjunction with the National Machine Tool Show, has now been completed, it is reported by A. C. Danekind, General Electric Co., who

is president of the Congress. The schedule is as follows:

Wednesday, Oct. 4—National Electric Manufacturers Association, Hotel Cleveland Ballroom, 8 p.m.

Thursday, Oct. 5—American Society of Mechanical Engineers, Machine Shop Practice Division, Hotel Cleve-

land Ballroom, 8 p.m.; American Society of Tool Engineers, Inc., Cleveland Engineering Society quarters, Guild Hall, 8 p.m.; General Electric Institute open house program and lighting demonstration, Nela Park, 7.30 to 10 p.m.

Friday, Oct. 6—American Society of Tool Engineers, Inc., dinner meeting, Hotel Statler Ballroom, 6.30 p.m.; National Association of Foremen, Music Hall, Cleveland Public Auditorium, 8 p.m.

Monday, Oct. 9—American Foundrymen's Association, Inc., dinner meetings, Hotel Hollenden Ballroom, 6.30 p.m.; symposium on castings, Hotel Hollenden Ballroom, 8 p.m.; Associated Machine Tool Dealers of America, dinner meeting, Hotel Cleveland Ballroom, 6.30 p.m.

Tuesday, Oct. 10—Cleveland Engineering Society, Machine Design Division, Music Hall, Cleveland Public Auditorium, 8 p.m.

Wednesday, Oct. 11—Society of Automotive Engineers, Inc., dinner meeting, Hotel Cleveland Ballroom, 6.30 p.m.

Thursday, Oct. 12—General Electric Institute dinner meeting and lighting demonstration, Nela Park, 6.30 p.m.

Several of the detailed programs are being currently announced, Mr. Danekind said, and others are expected to be ready shortly.

## Tool Engineers Program

The American Society of Tool Engineers, Inc., announces the following program for its Machine Tool Congress meetings:

*Thursday, Oct. 5*

Cleveland Engineering Society quarters, Guild Hall, 8 p.m.

Chairman: G. J. Hawkey, chairman, Cleveland Chapter A.S.T.E.

"Application of Anti-Friction Bearings on Machine Tools," Stanley R. Thomas, Chief Engineer, Bantam Bearings Corp., South Bend, Ind.

"Application of Plain Bearings on Machine Tools," Eugene Bouton, supervisor, time study, J. I. Case Tractor Works, Racine, Wis.

"Bearings—Their Use and Misuse," Karl L. Hermann, engineer, South Bend, Ind.

*Friday, Oct. 6*

Dinner meeting, Hotel Statler Ball Room, 6.30 p.m.

Chairman: James R. Weaver, president, A.S.T.E.

Second Report of Fact Finding Committee on "Effect of the Develop-



**When—** 1. The haul is short and load heavy or awkward.

2. The load must be accurately spotted, regardless of weight.

3. The load, because of its nature, must be carefully moved

(chemicals, hot foundry ladles, etc.)—

**The hand-geared trolley type A-E-CO Lo-Hed hoist—the one**

**operated by a chain is the logical choice.**

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Power.

• Lo-Heds range from  $\frac{1}{4}$  to 12 ton capacities  
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Operates on Standard I-beam or track of any  
make.  
Low headroom—stacks materials higher than  
any other hoist.  
Safe, fool-proof.  
Compact, strong, simply constructed.  
Protected against dust, moisture, fumes.  
Heavy duty, ball-bearing HOIST MOTOR.  
Automatic lowering brake.  
Ball or roller bearings at vital points.  
Improved plow-steel cable.  
100% positive automatic stop.  
Efficient spur-gear drive . . . and  
**LO-HED COSTS LESS PER LIFT**

**A-E-CO  
Lo-Hed  
HOISTS**

**AMERICAN ENGINEERING COMPANY**

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ment of the Machine on Employment and Our Standard of Living," John R. Younger, Professor, Department of Industrial Engineering, Ohio State University; Chairman of A.S.T.E. Fact Finding Committee.

"Economic and Political Effect of the Development of the Machine," Hamilton Fish, United States Congressman from New York.

The Machine Tool Congress session of the American Foundrymen's Association, Inc., on Oct. 9 will consist of a dinner meeting in the Hotel Hollenden Ball Room, at 6:30 p.m., with F. F. Hess, metallurgical engineer, Ohio Injector Co. and president of the Cleveland chapter, chairman, and a symposium on castings at 8 p.m. Participants in the latter will include Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland; James Thompson, chief engineer, Continental Roll & Steel Foundry Co., East Chicago, Ind., and chairman, Foundry Practice Committee, A.S.M.E.; and A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland, and chairman, Research Committee, Meehanite Research Institute.

The Society of Automotive Engineers, Inc., announces the following program for its Oct. 11 meeting, to be held as part of the Machine Tool Congress.

*Wednesday, Oct. 11*

Dinner meeting, Hotel Cleveland Ball Room, 6:30 p.m.

Toastmaster: W. J. Davidson, president, S.A.E.; sales manager, Diesel engine division, General Motors Corp.

"A Trip Through the Machine Tool Show," Joseph B. Geschelin, Detroit editor, *Automotive Industries*.

"Machine Tools in Modern Industry," F. E. Crawford, president, Thompson Products Co., and president, Cleveland Chamber of Commerce.

## Farm Equipment Exports Up 4 Per cent

WASHINGTON—Exports of farm equipment in June were valued at \$7,334,077, an increase of 4 per cent over the comparable figure for June, 1938, the Commerce Department's Machinery Division reports. Larger harvesting machinery and tractor shipments accounted for most of the gain, while tillage implements and seed separators showed declines of 12 and 22 per cent, respectively.

Valued at \$4,387,011, exports of tractors, parts and accessories were

7 per cent greater than a year ago when foreign shipments totaled \$4,104,863; wheel tractor exports were up 3 per cent to \$1,552,742 in June, 1939; and exports of tracklaying tractors were up 4 per cent to \$1,948,254.

June exports of tractor parts and accessories were valued at \$838,349 compared with \$714,069 in the same month of 1938 and exports of tillage implements totaled \$550,760, a 12 per cent decline below June of last year.

Valued at \$1,749,646, harvesting machinery shipments abroad in June

were 5 per cent above the corresponding figure for the same month in 1938.

## Crucible Net Income For Half Year \$350,822

CRUCIBLE STEEL CO. OF AMERICA reported a net income of \$350,822 for the first six months of 1939 compared with a net loss of \$1,540,360 in the like period of last year. Net sales for the half year totaled \$19,218,500, compared with \$12,716,948 in the 1938 period.



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"Finishing" school never stops for your Wyandotte Service Representative. He is constantly learning about new processes, new metal cleaners, new metal finishes. He learns about them first hand—on the job in metal finishing departments the country over. After he learns about them he passes his knowledge on to you.

Whatever your metal cleaning problem, your Wyandotte Service Representative will be able to help you solve it. Whether it is a matter of saving time, saving money or cleaning a difficult unit prior to finishing, it will pay you to give him a call today.



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All around efficiency, strength to withstand any feed and speed, scientifically worked out tool designs, and the basic ARMSTRONG principle that "Saves: All Forging, 70% Grinding, and 90% High Speed Steel" have led to the universal use of ARMSTRONG TOOL HOLDERS on every operation on lathes, planers, slotters and shapers, and on standard operations on turret lathes and screw machines.

If you have not kept up with the development of the ARMSTRONG System write today for an ARMSTRONG Catalog—you will find there many new tool holders that answer your new machining problems.

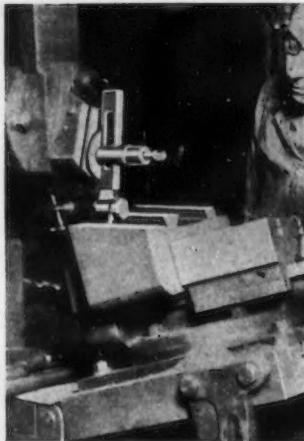
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ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms



96c. a Share Earned  
By Allis-Chalmers

ALLIS-CHALMERS MFG. CO., Milwaukee, reported for the first six months of 1939, a net income of \$1,700,422 or 96c. a share on the common stock, after charges and reserves. The net income for the six months ended June 30, 1938, was \$2,879,059 or \$1.62 a share. Billings for the six months were \$38,378,006 as compared with \$45,013,660 in the corresponding period of last year, a decrease of \$6,635,654 or 14.74 per cent. Orders booked for the first half year amounted to \$45,228,347, or 12.14 per cent over the \$40,332,295 bookings in the same period of 1938. Unfilled orders on June 30, 1939, totaled \$17,261,751 as compared with \$16,562,202 on June 30, 1938, and \$10,411,411 at the close of 1938.

## Inland Freighter Sets Tonnage Record

THE steamer, L. E. Block, flagship of the Inland Steel Co. ore freighters, has again broken the record for carrying the largest cargo of iron ore. She loaded 15,778 gross tons at Superior, Wis., on July 22, breaking her own record cargo made in June of this year.

## Foundry Equipment Makers Meet Oct. 6-7

CLEVELAND—The annual meeting of the Foundry Equipment Manufacturers Association will be held at the Greenbrier Hotel, White Sulphur Springs, W. Va., Oct. 6 and 7, according to A. J. Tuscany, executive secretary. In addition to handling such regular business as the election of three directors, the meeting will engage in a carefully prepared clinic of the business situation in the equipment field. Manufacturers of foundry equipment are invited to attend.

## Rustless Iron & Steel Has \$225,185 Profit

RUSTLESS IRON & STEEL CORP. reports a net profit for the second quarter of \$225,185, or 23c. a share, compared with \$207,778 profit in the first quarter and a loss of \$33,686 in the second quarter of 1938. C. E. Tuttle, president, announced that a \$1,300,000 expansion program has been authorized by the directors.



Many standard shapes are available to fit precise needs and to reduce manufacturing costs.

**OPEN HEARTH STEEL WIRE**

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Are you using wire that really fits the job—in shape, temper, finish, etc.?

✓ Why not investigate Continental Manufacturers Wire in special analysis open hearth steel or KONIK—a patented steel containing Copper, nickel and chromium.

## French Firm Buys Sheet Mill From Lewis Foundry

PITTSBURGH—Lewis Foundry & Machine division of Blaw-Knox Co. has received an order from Forges de Laval Aulnoye of northern France for one Lewis 3-high sheet mill. In accordance with a recent arrangement covering the manufacture and sale of certain Blaw-Knox products for European markets, Detombay of Charleroi, Belgium, will assist in producing this mill. Lewis Foundry will do the engineering and provide certain parts and all of the rolls. The unit will be a "balanced" mill, with two of its three rolls power driven, and equipped with automatic roller and catcher tables; automatic screwdown; new shape control water sprays; and special mechanical features to permit rapid roll changing.

## American Rolling Mill Earns 13c. a Share

AMERICAN ROLLING MILL CO. in the second quarter earned a net profit of \$875,671, after interest, taxes and depreciation, or 13c. a common share. This compares with \$793,479 net profit in the first quarter of this year (including non-recurring profit of \$400,000) and with a net loss of \$525,854 in the June quarter of 1938. "We anticipate an increased volume of business during the second half of the year," Calvin Verity, executive vice-president, said.

## Inland Steel Earns \$1.08 on Common Stock

INLAND STEEL CO. and its subsidiaries earned for the quarter ended June 30, 1939, a net income of \$1,760,458 after deductions for depreciation, taxes and interest. This amounted to \$1.08 a common share while earnings for the first six months of this year totaled \$2.33 a share. The company voted a dividend of 50c. a share, payable Sept. 1 to stock of record Aug. 15.

## Gear Sales in June Higher Than Year Ago

THE American Gear Manufacturers Association reports for the gear industry in the United States that June gear sales were 3 per cent under May and 55 per cent ahead of June of 1938. The first six months of 1939 showed a gain of 19 per cent over the same period of last year.

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your hair"

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# PERSONALS . . .

PHILIP M. GUBA has been appointed Eastern sales manager, Carnegie-Illinois Steel Corp., with headquarters at New York and Pittsburgh. He formerly was manager of sales, Chicago district. Mr. Gruba served 22 years with Jones & Laughlin Steel Corp., Donner Steel Co., and Republic Steel Corp. prior to his association with Carnegie-Illinois in 1933, at which time he was assistant manager of sales in the Detroit district sales office. In March, 1935, he was appointed manager of sales at that office and in January, 1938, was appointed manager of sales, Chicago district.

GRISWOLD A. PRICE succeeds Mr. Guba as manager of sales, Chicago district. He formerly was manager of sales, bar, strip, and semi-finished materials division, general sales department, Pittsburgh. Mr. Price has been with Carnegie-Illinois since his graduation from Northwestern University. He served in various capacities in the mills; in the general sales and in the district sales offices, being manager of sales at St. Louis when transferred to Chicago in 1935 to take charge of the bar, strip, and semi-finished materials division of the general sales department. Mr. Price was transferred to Pittsburgh as manager of sales, bar, strip, and semi-finished materials division, upon the combining of the Carnegie Steel Co. and the Illinois Steel Co. in 1935.

THOMAS J. BRAY, JR., succeeds Mr. Price as manager of sales, bar, strip, and semi-finished materials division, having previously been manager of sales, Pittsburgh district. Prior to his association with Carnegie-Illinois, Mr. Bray was employed by the Republic Iron & Steel Co. and later by the Koppers Co.

JOSEPH G. ARMSTRONG has been appointed manager of sales, Pittsburgh district, succeeding Mr. Bray. He had been assistant manager of sales in the Pittsburgh district since Feb. 1, 1936. Mr. Armstrong has been connected with Carnegie-Illinois since Oct. 1, 1924.

❖ ❖ ❖

FREDERICK M. GILLIES, for the past nine years assistant general superintendent of the Indiana Harbor works of Inland Steel Co., Chicago, has been appointed general superintendent of that plant, succeeding HENRY R. de HOLL, who has retired after 26 years of service, but who will retain his con-

nexion with the company in a consulting capacity.

Mr. Gillies first became identified with Inland in 1922 as superintendent of the 100-in. plate mill and has been in charge of several different divisions of the Indiana Harbor works. Prior to his affiliation with Inland, Mr. Gillies was associated with Illinois Steel

J. P. WILLIAMS, JR., will succeed Mr. Tierney as president of Koppers Co. Mr. Williams has been vice-president of Koppers United Co. for some years and president of the Koppers Coal Co. He will also serve as executive vice-president of the Koppers United Co.

❖ ❖ ❖

B. F. FAIRLESS, president of the United States Steel Corp., was a recent visitor at Superior, Wis., and the Head of the Lakes during his first



PHILIP M. GUBA, new Eastern sales manager of the Carnegie-Illinois Steel Corp.



GRISWOLD A. PRICE, manager of sales, Chicago district, Carnegie-Illinois Steel Corp.

Co. He is a graduate of Cornell University, majoring in engineering.

Mr. deHoll became associated with Inland in 1912, first as superintendent of the coke plants, and then in charge of blast furnaces and coke plants. He has been general superintendent for nine years. Previous to his association with Inland he was with the Tennessee Coal, Iron & Railroad Co., Birmingham.

❖ ❖ ❖

C. D. MARSHALL has resigned as chairman of the executive committee of the board of trustees, Koppers United Co., Pittsburgh, but will retain his membership on the board. He will be succeeded by J. T. TIERNEY, who will continue as president. In addition, Mr. Tierney will be chairman of the board of Koppers Co., resigning his position as president of this operating unit.



FREDERICK M. GILLIES, new general superintendent of the Indiana Harbor works of Inland Steel Co.

official inspection trip of company property in that area.

♦ ♦ ♦

S. W. SHARBROUGH has been appointed Texas agent for Electrunite steel tubes and Fretz-Moon conduit by Steel & Tubes, Inc., Republic Steel Corp. subsidiary. He will be located at 2427 South Ewing Avenue, Dallas, Tex., and will also represent the Thomas & Betts Co., Elizabeth, N. J., in connection with fittings and accessories for use with these two products.

NEWTON S. HOERLE, at one time chief engineer of the Muskegon plant of Continental Motors, Inc., and recently identified with the Carrier Corp., Syracuse, as production engineer, has been appointed factory manager of the Easy Washing Machine Corp., Syracuse.

♦ ♦ ♦

ALEXANDER GLASS, chairman of Wheeling Steel Corp., Wheeling, W. Va., last week was presented with a sheepskin booklet by friends and as-

four years has been in charge of research, has been elected a director and vice-president of the company. For seven years prior to 1935, Dr. Payne was associated with the Mellon Institute of Industrial Research.

♦ ♦ ♦

L. M. BANG has been named district sales manager in the Central-Western stoker division of the Link-Belt Co., Chicago. Mr. Bang formerly was with the Whiting Corp., Harvey, Ill., and has been identified with the stoker industry for a number of years.

♦ ♦ ♦

J. C. DANEC, chemical engineer, has recently been added to the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to the division of process metallurgy.

♦ ♦ ♦

H. B. HAYDEN, a member of the David J. Joseph Co., Cincinnati scrap broker, retired from his position of treasurer, the past week. Mr. Hayden, who is 65 years old, was feted by his associates at luncheon and presented with a wrist watch suitably inscribed.

♦ ♦ ♦

ERNEST A. DUNBAR, for many years assistant West Coast manager for Taylor-Wharton Iron & Steel Co., representing that company in the California gold dredging fields, has resigned to accept the position of assistant resident manager of the Yukon-Pacific Co. He will be located at the company operations at Kuala Lumpur, Federal Malay States.

♦ ♦ ♦

C. W. MAEDJE has been named director of General Electric lamp department publicity and public relations bureau, at Nela Park, Cleveland. He succeeds J. W. Milford, who recently left General Electric to join the publicity department of N. W. Ayer & Son. Since 1935 Mr. Maedje has served as associate director of the General Electric lamp department's publicity activities.

♦ ♦ ♦

S. J. HORRELL has been made sales manager of the power piping division of Blaw-Knox Co., Pittsburgh. He formerly was assistant sales manager of this division.

♦ ♦ ♦

WILLIAM D. STARR, formerly manager of the Eastern Engineering Co., New Haven, has joined the research staff of the Lea Mfg. Co., Waterbury, Conn.

♦ ♦ ♦

JEROME D. KENNEDY, general sales manager of the Western Electric Co.,



THOMAS J. BRAY, Jr., manager of sales, bar, strip and semi-finished materials division, general sales department, Carnegie-Illinois Steel Corp.



JOSEPH G. ARMSTRONG, manager of sales, Pittsburgh district, Carnegie-Illinois Steel Corp.



HENRY R. deHOLL, retired general superintendent of the Indiana Harbor Works of Inland Steel Co.

sociates on his eightieth birthday. He has been identified with the company and its predecessors since 1873.

♦ ♦ ♦

HUTSON COLCOCK has been appointed agent of conduit products in the New Orleans district for Steel & Tubes, Inc., Republic Steel Corp. subsidiary. Following graduation in 1930 from Tulane University, where he studied engineering, Mr. Colcock worked for Westinghouse Electric & Mfg. Co., and the New Orleans Public Service, Inc., and since 1934 has acted as a manufacturers' agent.

♦ ♦ ♦

RAYMOND B. SEYMOUR has resigned his position with the Goodyear Tire & Rubber Co., to join the research staff of the Atlas Mineral Products Co., Mertztown, Pa. Dr. Seymour will devote his time to the development of corrosion proof materials of construction. C. R. PAYNE, who for the last

New York, was tendered a testimonial dinner on July 27. He retired on Aug. 1 after more than 40 years of service with the company.

♦ ♦ ♦

LOUIS M. SLACK has been appointed representative of the Safety Grinding Wheel & Machine Co., Springfield, Ohio. He will cover the northern Ohio district, with headquarters in Cleveland.

♦ ♦ ♦

S. H. REYNOLDS, since 1932 manager of the Atlanta office of Crucible Steel Co. of America, New York, has been



S. H. REYNOLDS, manager of stainless steel sales, Crucible Steel Co. of America.

appointed manager of stainless steel sales. A graduate of Massachusetts Institute of Technology, he became identified with the company in 1924. He was formerly active in the New England territory. M. J. MCKEEVER has been made acting manager of the Atlanta branch. He has been with the company for the past eight years in the Syracuse laboratory of the company and more recently as sales representative at Atlanta. J. P. LARKIN has been made manager of the magnet department, with headquarters in New York.

♦ ♦ ♦

HAROLD S. SCHULER, formerly division manager of the apparatus advertising department of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed Pacific Coast district sales promotion manager. He succeeds EARL W. NILSSON, who has resigned.

### ... OBITUARY ...

HENRY D. SHUTE, former vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, died at his home in Miami, Fla., on July 15, aged 67 years. He became identified with the company in 1892, was made acting vice-president in 1910 and vice-president in charge of sales in 1917. He retired in 1931.

♦ ♦ ♦

RICHARD THEODORE LIEBAU, 58, associate of George Westinghouse for many years and later a mechanical engineer for the Republic Steel Corp., died July 22 at Youngstown.

♦ ♦ ♦

CARL LAGER, president, Morris Machine Works, Baldwinsville, N. Y., died July 17.

♦ ♦ ♦

P. DANIEL FITZPATRICK, general manager of the Grand Trunk Western Railroad, was buried July 26 at St. Albans, Vt. Mr. Fitzpatrick, a resident of Grosse Pointe, Mich., died in a hospital near his home where he underwent an operation several weeks ago. He was 59 years old.

Born in Springfield, Ill., Mr. Fitzpatrick attended Armour Institute in Chicago, and entered railway service with the Chicago and Northwestern in 1901. In engineering capacities he served several other railroads including the Illinois Central, Grand Trunk, Canadian National, Southern New England, Central Vermont and back again with Grand Trunk Railroad. He was chief engineer in Detroit until his promotion to general manager last Jan. 1.

♦ ♦ ♦

J. H. ALBRECHT, manufacturers' agent for D. B. Flower Mfg. Co. and Calebough Self Lubricating Brush Co., Inc., died July 27 at Pittsburgh. He worked in the testing division and steel mill division of Westinghouse Electric & Mfg. Co. from 1909 to 1917 when he became a manufacturers' agent. He had been an associate member of the Association of Iron and Steel Engineers since 1914. He was 52 years old.

♦ ♦ ♦

DAVID BLAIR MORROW, secretary-treasurer of the Globe-Wernicke Co., Cincinnati, Ohio, died at his home in Cincinnati July 22. He was 47 years old. He joined the Cincinnati firm in 1933 as vice-president and secretary. He was formerly associated with the United States Steel Corp. in Gary, Ind., and previously had worked for

the Brier Hill Steel Co., Girard, Ohio; General Fireproofing Co., Youngstown, and the Berger Mfg. Co., Canton, Ohio.

♦ ♦ ♦

EMMONS CROCKER, for more than 60 years head of a manufacturing plant in Fitchburg, Mass., and Quebec, died July 24 at his home in Fitchburg. He was born in Lawrence, Mass., 84 years ago, was graduated from Worcester Academy, Worcester, and attended Massachusetts Institute of Technology. He was president of the Union Screen Plate Co. and vice-president of the Union Machine Co. He also established the Union Foundry Co., Fitchburg, which he sold years ago.

♦ ♦ ♦

PETER DIDIER, a founder of the Rhinelander (Wis.) Iron Co., died at his home in Rhinelander July 24, aged 76 years.

### Accidents Less Frequent In Steel Plants

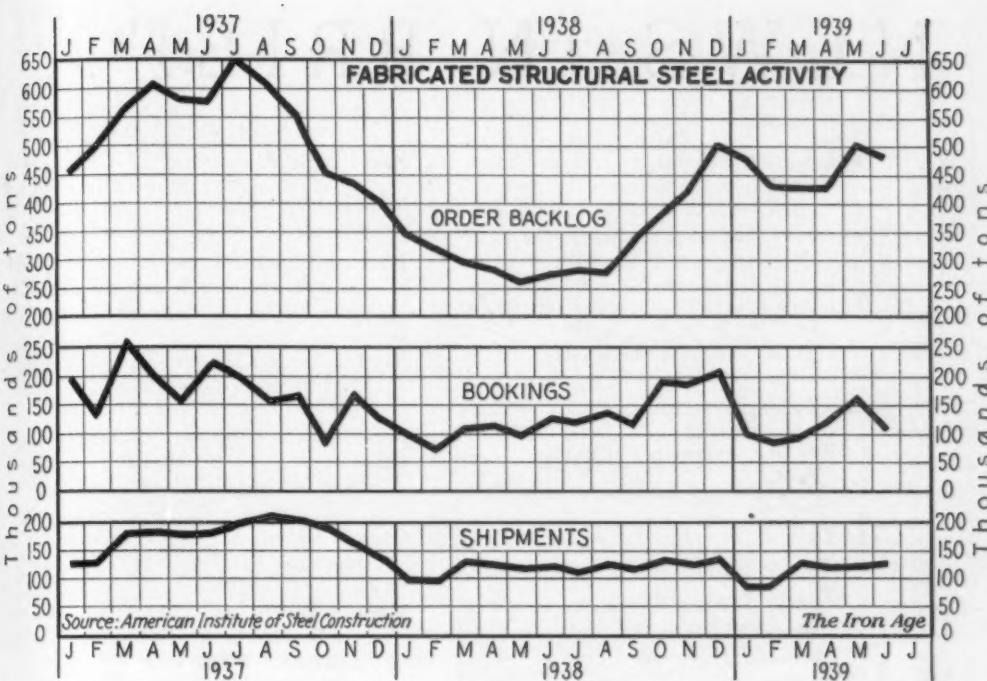
CHICAGO—In 1938, according to a National Safety Council report just issued, the steel industry averaged 6.56 reportable injuries for every million man-hours worked, and 1.84 days lost because of injuries for each thousand man-hours worked. The frequency rate is 46 per cent below the average for all industries, but the severity rate is 20 per cent above the all-industries figure. Both rates, however, declined from 1937, frequency being down 21 per cent, and severity 14 per cent, in each case the better showing exceeding the all-industries improvement made during the same period.

Small plants generally, the report showed, had the best results during 1938. While frequency rates were higher, severity rates were much lower than in the large plants.

Frequency rates averaged highest in strip mills, 9.82, open hearth departments, 8.07, and in sheet mills, 7.90. Sheet mills, foundries and coke plants had the highest severity rates, ranging from 2.44 to 3.18.

### Superior Steel Net Loss Is \$54,043

SUPERIOR STEEL CORP.'S net loss for the second quarter was \$54,043, compared with loss of \$121,290 in the second period of 1938. For the first half of 1939 the loss of \$60,776 compared with a loss of \$262,458 in the first half of 1938.



THE trend of backlog, orders and shipments of fabricated structural steel over the past two and a half years is shown in the accompanying chart, which is based on reports of the American Institute of Steel Construction.

## Fabricated Structural Steel Shipments at Two-Year High

SHIPMENTS of fabricated structural steel during June were the largest for any month in the past two years, according to reports received by the American Institute of Steel Construction. June shipments totaled 128,395 tons in comparison with a monthly average this year of little more than 111,000 tons. The new orders booked during June were larger than for any month this year with the exception of April and May.

New business booked by the industry during the first half of 1939 was 49.5 per cent of the average total bookings for the first six months of

the years 1923-1925 inclusive (6/12 of 2,675,000 tons) which were compiled by the U. S. Department of Commerce. The 1923-1925 base is used for comparison with the charts "Construction Contracts Awarded" currently appearing in the monthly Survey of Current Business published by the Bureau of Foreign and Domestic Commerce of the U. S. Department of Commerce, which are based on the index, 1923-1925 equals 100.

The accompanying table shows the complete tabulation of bookings and shipments.

of intermittent operations and lack of an outlet for the waste gases, the furnace will be closed and the ore moved to Buffalo by rail and converted to pig iron at Republic's plant there. No additional furnace capacity is needed at Buffalo to take care of this additional operation, it is said. Pig iron molds used at the Chateaugay furnace will be shipped to Buffalo.

J. R. Linney, vice-president of the Chateaugay company, a subsidiary of Delaware & Hudson Railroad Corp., will join the Republic organization, and R. G. Linney, general manager of the mining company, will continue in charge of mining operations. William Linney, who had been in charge of the Standish furnace, will supervise production of pig iron from Chateaugay ore at Republic's Buffalo plant.

Republic has not yet indicated whether or not Buffalo will be established as a basing point for low phosphorous iron. The Chateaugay iron has been sold on a Standish, N. Y., base in the past.

The acquisition of the Lyon Mountain properties is the second move by Republic to increase its ore resources in Northern New York in the past two years. In October, 1937, the steel company leased the Port Henry, N. Y., mines of the Witherbee-Sherman Corp. Located about 60 miles south of the Lyon Mountain mines, the Port Henry mines are rated with an annual capacity of 1,000,000 tons.

	Est. Total Tonnage for the Entire Industry 1939	Est. Total Tonnage for the Entire Industry 1938
<b>Contracts Closed:</b>		
January	101,712	80,320
February	82,719	57,144
March	95,065	84,257
April	118,775	91,158
May	155,093	77,322
June	109,267	99,899
<b>Totals</b>	<b>662,631</b>	<b>490,100</b>
<b>Shipments:</b>		
January	84,281	87,763
February	84,412	81,161
March	125,259	103,300
April	120,177	100,038
May	124,542	96,439
June	128,395	98,554
<b>Totals</b>	<b>667,066</b>	<b>567,255</b>
Tonnage available for future fabrication—481,234.		

### Republic Leases Chateaugay Mines

CLEVELAND—Republic Steel Corp. has expanded its iron ore resources in Northern New York by leasing the low phosphorous mines of the Chateaugay Ore & Iron Co. at Lyon Mountain, New York, for 25 years from Aug. 1.

These mines, located between Plattsburgh and Malone, N. Y., have been in operation for more than 75 years and in recent years have been producing at the rate of 500,000 tons annually. The mines have a maximum annual capacity of 1,200,000 tons of crude ore and 600,000 tons of concentrates. The lease includes the blast furnace at Standish, N. Y., but because

# THE NEWS IN BRIEF

American Federation of Labor begins campaign to unionize automobile plants.—Page 56.

Automobile production to hit low point of the season either this week or next.—Page 58.

Japan's buying from U. S., already pared, unlikely to decline with abrogation of 1911 treaty.—Page 60.

Railway equipment exports in first six months of 1939 under 1938 level.—Page 60.

Spend-lend bill provisions for toll roads and Government rail equipment purchases thrown overboard by economy bloc.—Page 62.

Garner a poker-player, whisky-drinker, John L. Lewis reports; friends rally to vice-president.—Page 64.

Government orders for steel in latest reported week total \$2,044,429.—Page 64.

Navy Department awards tool and equipment contracts.—Page 66.

Machinery exports from U. S. taper in June.—Page 67.

Public grows more opposed to compulsory unionization, N.A.M. poll shows.—Page 68.

ICC approves building of 50 fusion-welded tank cars.—Page 69.

Program for Machine Tool Congress at Cleveland is announced.—Page 70.

Farm equipment exports show gain in June.—Page 71.

Inland Steel Co. freighter sets new ore-carrying record.—Page 72.

Allis-Chalmers Mfg. Co. earns 96c. a share in first six months.—Page 72.

Foundry Equipment Manufacturers Association meeting Oct. 6-7 at White Sulphur Springs.—Page 72.

Gear sales in June 55 per cent above like month of 1938.—Page 73.

French firm buys sheet mill from Blaw-Knox division.—Page 73.

American Rolling Mill earns 13c. a share.—Page 73.

Inland Steel earns \$1.08 on common stock.—Page 73.

Accidents less frequent, more severe in steel industry.—Page 73C.

Fabricated structural steel shipments in June were largest for any month in past two years, American Institute of Steel Construction reports.—Page 73D.

Republic Steel Corp. leases Chateaugay Ore & Iron Co. mines in New York State.—Page 73D.

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Soviet places \$250,000 lift truck order in Chicago.—Page 76.

Steel prices hardening, Eugene G. Grace reports; Bethlehem pays common dividend.—Page 77.

Canada holidays affect demand for iron and steel.—Page 78.

Manufacturers of enameling sheets study charts at Columbus, Ohio, meeting.—Page 78.

Otis Steel Co. third quarter deficit is \$431,766.—Page 79.

Britain increases purchases of machine tools from the U. S.—Page 79.

Austin Co. builds new aviation plant at Indianapolis for G-M.—Page 79.

Milwaukee metal shops report more on payrolls in June.—Page 80.

Booklet showing technique of industrial photography issued by Reliance Electric & Engineering Co.—Page 80.

R. E. Desvergne, president, Crucible Steel Co. of America, lists 10 reasons why business will improve.—Page 81.

United States imports of steel rise 24.3 per cent during June.—Page 82.

American Hot Dip Galvanizers Association meeting to be held Aug. 24-25 at Cleveland.—Page 83.

G-M picket asks: "Do you feel like fighting?" . . . 46 in hospital.—Page 83.

Wheeling Steel Corp. earns profit of \$939,995 in second quarter.—Page 83.

Association of Iron and Steel Engineers convention to draw 5000.—Page 83.

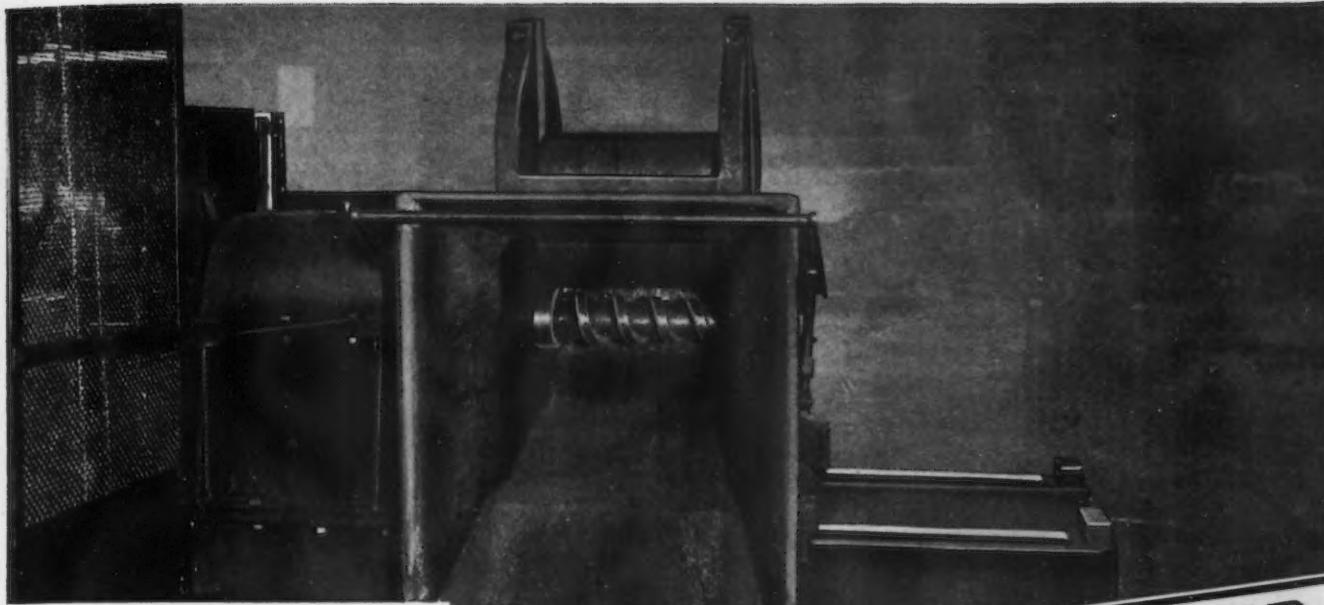
House approves bartering of cotton for foreign strategic war materials.—Page 83.

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## MEETINGS

Aug. 28 and 29—Institute of Scrap Iron and Steel, Cleveland.
Aug. 28 to 31—American Mining Congress, Salt Lake City.
Sept. 4 to 8—British-American Engineering Congress, New York.
Sept. 8 and 9—American Ceramic Society, Conneaut Lake, Pa.
Sept. 20 to 22—National Industrial Advertisers Association, New York.
Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.
Oct. 4 to 13—National Machine Tool Builders' Association, Cleveland.
Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.
Oct. 6 to 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.
Oct. 16—Society of Automotive Engineers, annual dinner, New York.
Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.
Oct. 23 to 27—National Metal Congress, Chicago.
Nov. 16 and 17—Porcelain Enamel Institute, New York.

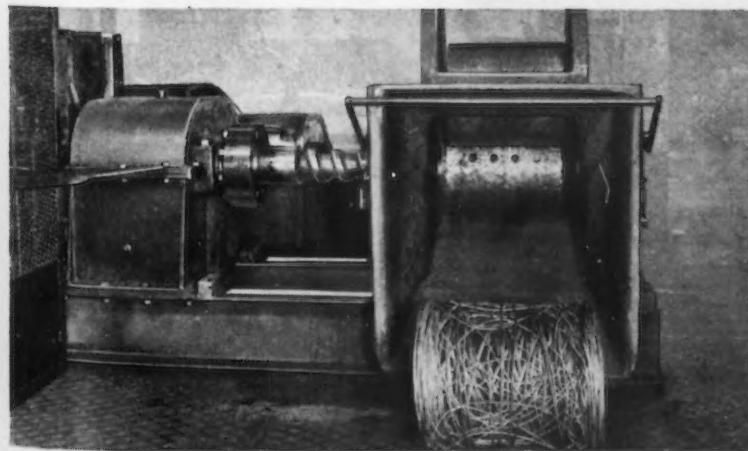


New, self-contained Morgan Cobble Bundler showing spiral mandrel, weight roller, safety arm, and guard screen.

## MORGAN'S NEW COBBLE BUNDLER



Cobble Bundler in operation. This view also shows motor and controls.



As the motor is reversed the mandrel frees itself from the center of the bundle, causing bundle and hopper to move outward along the track-way until bundle is free, when it discharges by gravity. Hopper is then pushed back over the mandrel, and machine is again ready for use.

### Takes the Lag out of Cobble Handling

Even cobble handling is made simpler and safer by typical Morgan thoroughness in design and perfection of details. This improved Morgan Cobble Bundler is a self-contained, semi-portable unit which takes up cobble quickly and effectively, bundling it to size suitable for open hearth charging boxes.

It is a complete unit ready to run; equipped with AC motor with solenoid brake or a DC motor with dynamic brake, a control panel and special safeguards. The tapered mandrel has a coarse spiral thread which, as the motor is reversed, strips off the bundle, which then discharges by gravity. Safety of operation is stressed, an important feature being the guard-arm which stops the motor instantly with any up or down movement.

Write for further details on this Bundler and on other improved Morgan Rolling Mill Equipment.

**MORGAN CONSTRUCTION COMPANY  
WORCESTER, MASSACHUSETTS, U.S.A.**

R-60

**LET MORGAN REMOVE THE LAGS**

## U.S. Steel Day at Fair Sept. 26

TUESDAY, Sept. 26, has been designated as United States Steel Day at the New York World's Fair. The tentatively scheduled date was Aug. 13.

Focal point for observance of the day will be the novel "inside-out" building which houses the United States Steel subsidiaries' exhibit at the Fair. The building, a stainless steel dome 66 ft. high and 132 ft. wide, features an unusual type of construction in which the 350 tons of support-

ing steel trusses form a part of its streamlined exterior.

Featured under this dome is a "Hall of the Future" which shows the possible evolution of the farm, the home, the highway, and the city of tomorrow. In addition to presenting this glimpse into the future, the exhibit contains animated dioramas which offer the visitor close-up views of present day steel-making operations from ore mining to rolling of the finished products. Other displays demonstrate the performance of steel in the "World of Today," and the research which is setting the stage for the "World of Tomorrow."

## Financial Facts of Steel Industry Told in Booklet

THE American Iron and Steel Institute has published a booklet titled, "Dollars Behind Steel," containing pertinent facts regarding the financial status of the steel industry. Copies are available for free distribution. Among the interesting facts given in the booklet are the following:

Between 1909 and 1938 the value of the steel industry's total investment increased from \$3,286,000,000 to \$4,470,000,000.

Invested capital in the industry at the end of 1938 averaged about \$195 a ton as compared with \$150 in the decade 1909-1918.

Since 1929 investment in the steel industry has averaged \$60 per dollar of profit.

An investment of about \$10,000 is required to create a job for a worker in the industry.

Between 1925 and 1938 the industry cut its bonded indebtedness more than a third.

Plants and properties of the industry constitute about 75 per cent of its total assets compared with 45 per cent for all other manufacturing industries.

Since 1909 the production of finished steel has increased relatively more than the growth of population of the United States.

Since 1929 the return on investment to stockholders in the steel industry has averaged 2.4 per cent.

In normal times it takes the steel industry 22 months to "turn over" its investment. During the depression investment was turned over at the rate of once in 50 months.

Payrolls take 40½c. out of each dollar of steel sales.

## Soviet Places \$250,000 Lift Truck Order in U. S.

CHICAGO—What is said to be one of the largest single orders for industrial materials handling trucks since the World War was received last week by the Automatic Transportation Co., Chicago, from the Russian Government. For an expenditure approximating \$250,000 the Soviet is to receive 78 "Automatic" electric industrial lift trucks, and 157 industrial batteries, with shipments scheduled to begin in October. The Automatic Transportation Co. is a pioneer manufacturer of industrial trucks, tractors, and cranes.



## GAIRING Multi-Diameter Cutters

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Boring Tools  
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The Gairing Tool Co., Detroit, Mich.  
In Canada, Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING  
TOOLS FOR 21 YEARS

## Grace Finds Prices Harden; Bethlehem Dividend Voted

STEEL prices now have a tendency to harden, Eugene G. Grace, president of Bethlehem Steel Corp., said last week following declaration by Bethlehem directors of a 50c. dividend, the first on the company's common stock since late in 1937. He added that no test of automotive steel prices will come this year since the automobile companies are covered in their requirements to the end of 1939. Miscellaneous flat-rolled consumers, who participated with the automotive producers in the spring steel buying movement, are covered through September, he said.

The price situation prevailing in the steel industry in recent months has sometimes been misinterpreted, Mr. Grace said. What happened in the sheet and strip market, he said, was that prices in the third quarter of 1938 were carried on through 1939, due largely to efforts of automobile producers to buy steel on an annual basis. Benefits obtained by the building of \$350,000,000 of continuous rolling mills in the steel industry have been passed entirely to consumers and steel earnings have continued low, he said.

### Dividend "Conservative"

Payment of the common dividend (Sept. 15 to stock of record Aug. 25) is "conservative" when Bethlehem's strong cash position, about \$66,000,000, and the business outlook are considered, Mr. Grace said. "We see nothing to warrant the belief that things are going to pieces," he said.

The Bethlehem company, which earned \$3,822,927 in the quarter ended June 30, compared with net profit of \$2,409,059 in the first quarter of 1939 and of \$150,305 in the second quarter of 1938, reported that steel production averaged 60.4 per cent in the second period against 53.8 per cent in the first quarter of 1939 and 35.7 per cent in the second three months of last year, while current production is 61 per cent.

Unfilled orders on June 30, totaled \$184,921,081 compared with \$192,040,906 on March 31, 1939, and \$89,916,012 on June 30, 1938. Approximately 10 per cent of the company's business in the first half of 1939 was exports compared with 15.5 per cent in the first half of last year. Steel consumers have no "important inventories," the Bethlehem president said.

Additions and improvements to Bethlehem plants in 1939 will cost about \$1,000,000 monthly, the chief current construction being at the Sparrows Point, Md., plant where capacity of the cold rolled tin plate department is being increased 10,000 tons a month, equipment for the continuous rolling

of small pipe under a variation of the Fretz-Moon process with an increase in capacity of 5000 tons a month, and the installation of another unit to produce 1000 tons monthly of electrically-coated bethanized wire.

Mr. Grace said that Bethlehem's relations with its employees "have never been better." The average number of employees in the second quarter was 88,447 compared with 80,387 a year earlier while the average work week in the second period was 34.2

# ECONOMY



JOHNSON *Ledaloyl*  
SELF LUBRICATING

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Making LEDALOYL is essentially a series of pressing operations. The final forming produces a bearing that is ready for immediate installation. All machining work . . . all broaching, boring, reaming . . . is eliminated. Oil grooves, slots or costly lubrication aids are unnecessary because LEDALOYL is self lubricating.

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As to performance . . . we ask that you test a LEDALOYL bearing in comparison to any sintered bronze on the market. Convince yourself that no other bearing will equal LEDALOYL'S record for long life, quiet operation and smooth performance. Your inquiry carries no obligation.

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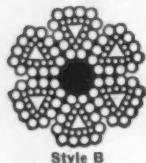
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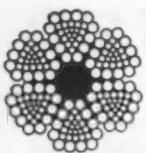
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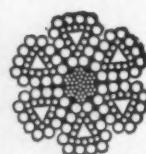
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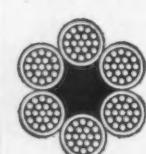
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"B"  
Flattened Strand



Wire Rope Center



Steel Clad

### You Can Depend On "HERCULES"\*\* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

### —PREFORMED—

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Made Only By

**A. LESCHEN & SONS ROPE CO.**

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18x7  
Non-Rotating

6x19  
Filler Wire

6x19  
Scale

6x37  
Extra Flexible

8x19  
Extra Flexible

hr. against 28.2 in the like period of 1938.

Bethlehem's earnings statement, indicating a profit of 61c. a share for common after deductions for preferred dividends, follows:

2nd quar.	1st quar.	2nd quar.
1939	1939	1938
Total income . . . . \$9,843,095	\$8,481,791	\$5,969,167
Interest, etc. . . . . 1,794,836	1,825,354	1,781,277
Depreciation . . . . 4,225,782	4,409,059	4,037,585
Net income . . . . \$3,822,927	\$2,409,059	\$150,395

### Canada Holidays Affect Demand for Iron and Steel

TORONTO, Aug. 1—The holiday season is largely responsible for slowing down in demand for finished and semi-finished materials in the Canadian iron and steel markets. A large number of plants have shut down or greatly curtailed operations, some announcing that work will not be resumed for a couple of weeks. Iron and steel sales as a result have dropped sharply and the only business now appearing is for small lots for spot delivery. Warehouse operators, however, report a steady flow of small orders.

Pig iron melters are taking iron as demands dictate. With curtailment in the melt to less than 50 per cent, iron demand is correspondingly lower.

### Makers of Enameling Sheets Hold Meeting

CHICAGO—Representatives of the iron and steel companies that manufacture enameling sheets met at Columbus, Ohio, July 18, to discuss the development of the market for architectural porcelain enamel.

Reports of interviews with many prominent architects, read at the meeting, indicated that porcelain enamel is one of the most promising of the newer architectural materials. Charts of sales showed that 1939 shipments were well ahead of both 1937 and 1938.

The committee will meet again in the early fall to consider a plan of cooperative action which will be ready at that time. The men present included: Harry V. Mercer, Ray Dadisman and Paul Weinman, American Rolling Mill Co.; C. H. Fitzwilson and Harold Skemp, Carnegie-Illinois Steel Co.; S. E. Eldridge, Newport Rolling Mill Co.; C. B. Pharo, Jr., Republic Steel Corp.; J. M. Tuthill, Youngstown Sheet & Tube Co.; R. M. King, Ohio State University; and C. S. Pearce, Porcelain Enamel Institute. J. H. Wilson of Armco represented the Building Code Committee of the American Iron and Steel Institute at the meeting.

## Austin Co. Builds New Aviation Plant for G-M

CLEVELAND—Erection of steel was completed at Indianapolis last week by the Austin Co. for the new aviation plant of the Allison Engineering Division of General Motors Corp. Field work started only three weeks ago. The new plant, having more than a quarter-million square feet, will be devoted to the manufacture and development of high-powered liquid-cooled aircraft engines and will be ready for occupancy by fall. Air-conditioning, acoustical walls and complete light control giving uniform illumination 24 hours a day will provide ideal working conditions.

The plant will be entirely welded and will have face brick exterior with limestone trim incorporating striking modern lines.

## British Increase Purchases Of U. S. Machine Tools

UNITED STATES exports of metal working machinery to the United Kingdom in the first four months of this year amounted to \$6,998,069 as compared with \$5,525,169 for the same period in 1938, according to the Bureau of Foreign and Domestic Commerce. This country continues to occupy the dominant position of chief outside supplier of machine tools, accounting for over half the imports into Great Britain. Germany is the other important supplier.

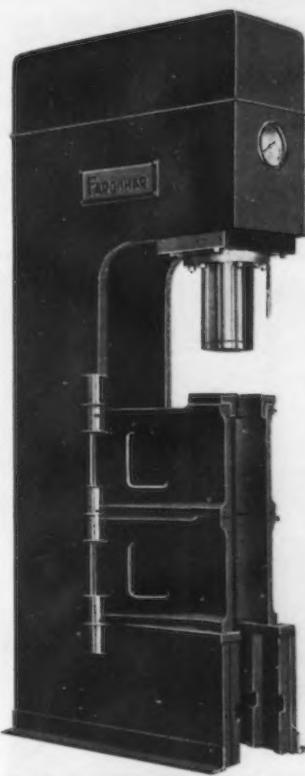
Exports of metal working machinery from Great Britain also show an increase this year. For the first quarter they were slightly higher than imports of like equipment. For January and February, over half these British exports went to the Soviet Union. British machine tool builders also found important markets in Poland, France and Japan. No substantial decline is looked for in either imports or exports in the near future so that the year as a whole should be well above the activity of 1938.

## Otis Third Quarter Deficit is \$431,766

OTIS STEEL CO. reports a net loss of \$431,766, after taxes, interest and depreciation, for the second quarter, as compared with a profit of \$228,804 in the preceding period and a deficit of \$520,101 in the second quarter of 1938. Loss for the first six months of the present year is \$251,441 as against a loss of \$817,480 in the first half of 1938.

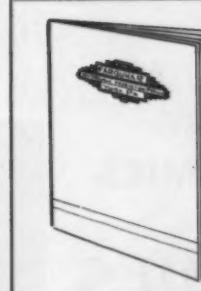
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## “Is it hot enough for you?” —your metal plating or pickling solution?

### Direct Steam Heaters

*Duriron Circulating Steam Jets* are used to heat corrosive solutions by injecting steam directly into the solution. Available in two types with different size orifices for various capacities. Circulate and agitate the tank contents, heat rapidly, save on steam, eliminate destructive pounding. Write for Bulletin No. 1801.

The productive capacity of the tank is increased by thus having the heating unit located outside the tank. Write for Bulletin No. 1601 for detailed information.

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Are made of standard Duriron pipe and fittings. Standard sections are joined by welding to make a jointless unit.

### Indirect Steam Heaters Duriron Heat Exchangers

*Duriron Heat Exchangers* are used to heat plating solutions and metal pickling solutions and wherever steam cannot be introduced directly into the solution.

### Duriron Immersion Tubes

For the heating of small and comparatively wide, shallow tanks. Two types are available—"Bayonet" and "Ell." Tube diameters of 1", 1½", 2" and 3" and lengths up to five feet.

Two sizes are available with capacities from 4 to 50 g.p.m. A portable unit is available for batch operations.

If you heat corrosive solutions, let us help you reduce the cost of corrosion. Write for detailed information.

**THE DURIIRON COMPANY, Inc.**  
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## Milwaukee Metal Shops Employ More

**M**ILWAUKEE—According to figures compiled through a survey of 36 metal trade shops, here, total man hours and the number of men employed increased in June over the previous month, but the average hours worked per week noted a decline. Hours worked per week during June average 39.2, compared with 41.6 in May, and 39.1 in April.

## Sheet & Tube To Install New Butt Weld Unit

**C**LEVELAND—Youngstown Sheet & Tube Co. shortly will begin construction of a new butt weld pipe unit at its Campbell, Ohio, plant. The contract for the new unit, which will be of the Fretz-Moon type and will make pipe in diameters ranging from  $\frac{1}{2}$  to 3 in., has not yet been awarded. The 10-in. skelp mill at the plant will be equipped with coilers to

supply the required raw material. It is believed the cost of the mill will be about \$250,000.

The new Fretz-Moon gas butt weld pipe unit being constructed by Aetna-Standard Engineering Co. for the Youngstown plant of Republic Steel Corp. is expected to be in operation by Sept. 1. Salem Engineering Co. is building the furnace.

## Booklet Shows Technique Of Industrial Photography

**C**LEVELAND—Photographs which show applications of industrial equipment must frequently be made without the supervision of anyone from the manufacturer's own organization. As a consequence, unless very clear and detailed instructions have been forwarded to the photographer in the field, the pictures which are taken in a customer's plant may be far from satisfactory.

As a manufacturing concern which often uses photographs of its motor applications in plants in a wide range of industries, the Reliance Electric & Engineering Co., Cleveland, has compiled a simple, two-page booklet of instructions which it sends photographers as they are given assignments.

Made up on an  $8\frac{1}{2} \times 11$  sheet are nine typical pictures. On a facing page are comments on each of the pictures and instructions.

## Cleveland Firm Gets Mesabi Iron Option

**C**LEVELAND—Reserve Mining Co., subsidiary of Oglebay, Norton & Co., has been granted a 100-day option on some of the Mesabi Iron Co.'s properties and holdings and given the right to acquire mining properties in Minnesota and timber rights which the Mesabi Iron Co. holds from the East Mesaba Iron Co. and Dunka River Iron Co.

Reserve Co. would pay Mesabi sufficient money to satisfy its current liabilities, provide funds for maintenance of the company and assume other financial obligations.

Mesabi controls 16,000 acres of ore lands in Minnesota and was engaged in developing the properties until June, 1924.

**P**orcelain Enamel & Mfg. Co., Eastern and Pemco Avenues, Baltimore, is installing two complete continuous grinding plants for preparing premilled enamels. These units have a capacity each up to one carload a day. The first plant is scheduled to go into operation on July 10, and the other on Aug. 7.

## Improvements in the Engineering and Design of Fuel Oil Systems NOW PERMIT YOU TO SWITCH TO THE ECONOMIES OF HEAVY OILS

**T**o satisfactorily utilize all of the combustibles in the lower priced low grades of heavy oils has been a stumbling block.

With the importance of the fuel problem in mind "Salem" engineers made an intensive study of ways and means to make the heavy oils practical for metal heating and treating furnaces.

The result is that today "Salem" is able to offer systems for burning the heavy oils economically, without shutdowns due to clogged lines or valves, and with all of the control possible with gas or other fuels.

Two features of the "Salem" method are controlled force feed circulation and proper equipment to break down and keep in free circulation the solids and semi-solids common to the heavy oils. By breaking these solids down into sufficiently minute particles, ready combustion, uniform firing and the elimination of line troubles are achieved.

If you are located where oil shipments may offer economies over other fuels why not call in a qualified "Salem" representative—who will be glad to discuss the potentials with you—or avail yourself of the offer at the right.

**SALEM, OHIO:** CHICAGO, DETROIT, PITTSBURGH, NEW YORK, LONDON, PARIS, BERLIN — WELLAND, ONT.

**SALEM ENGINEERING COMPANY**

## Desvernine Lists 10 Signs of New Business Gains

**R.** E. DESVERNINE, president of Crucible Steel Co. of America, the past week listed ten "harbingers of better times," which, he said, were based on his interviews with other industrialists. They are:

(1) If we have been right that certain political policies have been the primary deterrents to business, we must be greatly encouraged by recent convincing indications of a real and far reaching change in the thinking of



RAOUL E. DESVERNINE

the rank and file of the people on these policies. The last elections were a portentous sign.

(2) Inventories in general are low, in most cases below normal which usually forecasts improved customer demands.

(3) There is a widespread urgent need of replacements and modernizations. Years of forced economy have produced great obsolescence.

(4) The farmers' purchasing power is above 1937-1938 and the outlook is for good crops, favorable weather in the farm areas continuing.

(5) The trade index of general business activity is marked by a considerable advance recently, and there

is every reason to believe that, despite interruptions, further moderate net gains will continue.

(6) Continuance of monetary and credit expansion and Federal spending is bound to have some consequential effect, even though temporary and artificial.

(7) The reflection in this country's export trade of an increase in armament purchases will be noticeable.

(8) This season has been one of

the most active building seasons in nearly a decade.

(9) So far the average business for 1939 has been generally better than 1938 which has improved business virility and there is every indication that the balance of the year will insure a better 1939 than 1938.

(10) There is an unprecedented backlog of reserves in banks and in the hands of private investors seeking investment if released from the fear of insecurity.

**Tell us when you NEED ACCURATE WIRE FORMS-**

**OR**

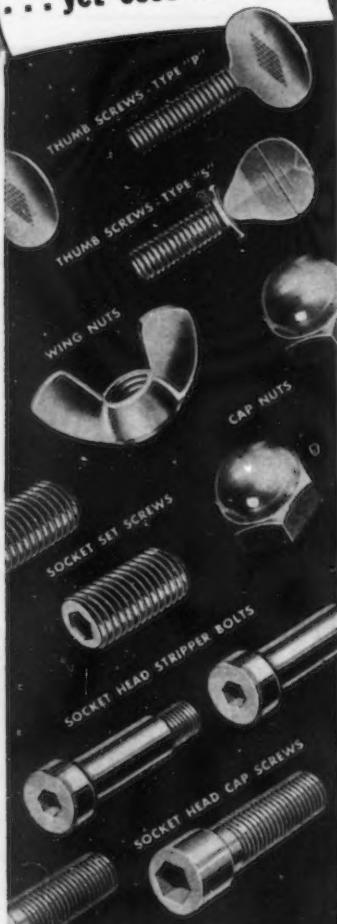
**SPRINGS**

*any kind  
for any purpose  
of any material*

**IN** the Accurate plant there is a battery of modern Four Slide machines turning out wire forms at the rate of thousands per hour. Some of these wire shapes are odd — some are extremely simple — but most all of them have important jobs to do. That's why they must be carefully designed — accurately made — and also economically produced. They are at Accurate!

We invite you to TELL US when you need wire forms, springs, or small stampings. Ask for quotations or to see an Accurate engineer.

**ACCURATE SPRING MANUFACTURING COMPANY**  
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SOCKET SCREWS  
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REPUTABLE DISTRIBUTORS

## Steel Imports Climb 24.3 Per Cent

WASHINGTON — Imports of iron and steel products in June totaled 30,050 tons, representing a 24.3 per cent increase over the 24,171 tons imported in May, the Commerce Department's Bureau of Foreign and Domestic Commerce reports. Imports for June, 1938, totaled 15,573 tons. Import values were estimated at \$1,487,504 for June, \$1,405,833 for May and \$1,035,536 for June, 1938.

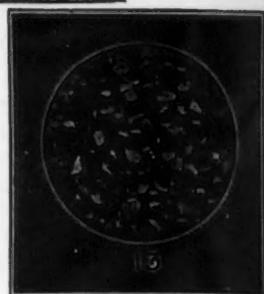
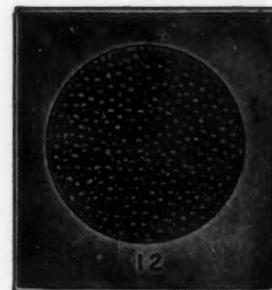
With the 162,191 tons of iron and steel products imported in the first six months of this year 37.6 per cent ahead of the 117,815 tons imported in the comparable period last year, imports for June found Belgium again heading the list with 9074 tons, of which 3542 tons represented structural shapes. Canada was second, with 7430 tons, of which there were 5790 tons of spiegel-eisen. Third place went to France with 3482 tons, of which 1641 tons represented structural shapes.

From a tonnage standpoint, spiegel-eisen ranked first among classes of products with 5790 tons out of a total of 5792 tons coming from Canada. Structural shapes totaling 5183 tons ranked next with Belgium sending 3542 tons and France, 1641 tons. Pig iron came third with 4276 tons from British India, 1802 tons from Canada and 211 tons from Canada. Imports of ferromanganese totaled 2494 tons, of which 1495 tons came from the Netherlands, 129 tons from France and 870 tons from Norway. Amounting to 15,424 tons, imports of 35 per cent manganese ore came principally from the Gold Coast of Africa which sent 5911 tons; Russia, 4208 tons; British India, 3891 tons; Cuba, 1400 tons and France, 14 tons.

Scrap iron and steel imports in June dropped to 2537 tons from the 3971 ton total in May, but were still ahead of the 314 tons in June, 1938. In the first half of 1939, there were 14,803 tons of scrap imported as compared with 1170 tons imported in the same period of 1938.

### Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 20 tons of iron ore from England; 7788 tons of chrome ore and 1180 tons of pig iron from British India; 100 tons of ferromanganese, 2 tons of steel bands, 16 tons of steel bars and 62 tons of structural shapes from France; 52 tons of steel bands, 15 tons of steel bars and 320 tons of structural shapes from Belgium.



## DOLLARS Saved Daily

Since the introduction of our  
Heat-Treated Steel Shot  
And  
Heat-Treated Steel Grit

### Consumers are saving

10 per cent  
15 per cent  
25 per cent

Metal blasting faster.

Metal blasting cheaper.

Metal blasting with a better  
finish than ever before.

Our large, modern plant produces only heat-treated abrasives—uniform quality the year round.

A month's run of our shot or grit in your machine will prove the above statements.

Send us samples of the sizes you use; test our product in your own machine and save money.

A ton or a carload.

**HARRISON  
ABRASIVE**  
*Corporation*

MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

## G-M Picket Asks "Do You Feel Like Fighting?"—46 in Hospital

CLEVELAND—The scene of the UAW efforts to bottle up General Motors shifted to Cleveland last week as the automobile union attempted to shut down the Fisher Body plant on Coit Avenue, the only General Motors plant in Ohio operating. The UAW apparently attaches significance to this effort, for it transferred Robert Travis, ace CIO-UAW organizer who led the Flint sit-down strikes in 1937, from Detroit to Cleveland to guide the local group's activities.

Beginning with a comparatively mild demonstration in front of the plant Friday, when Travis told a gathering of 3000 strikers and sympathizers, including a bus load of SWOC members, "We want you to come out and see those scabs, and then it's up to you to decide what you want to do to them," the striking union's efforts reached a climax on Monday when close to 5000 strikers, armed with clubs, bricks and even a tear gas cannon, battled 450 police who endeavored to protect non-striking workers entering the plant.

The rioting, which was touched off

by the query of a belligerent striker, armed with a club, "Do you feel like fighting this morning?" resulted in the hospitalization of 46 persons, the arrest of 12 strikers and the tipping over of two cars.

The strikers' efforts to prevent workers from entering the plant was said to be aided by a tear gas cannon, which fired shells directly into the ranks of the police. After examining the markings on fragments of the shells fired by the strikers, police reported the gas bombs came from Flint, Mich., and Pittsburgh.

Despite the fighting, over 450 employees entered the plant, according to Fisher Body officials, but this was not sufficient to permit operation of the plant. Many workers in other automobile parts plants in Cleveland joined the picket line, causing practically a complete cessation of all automobile parts manufacture in the city. Plants of the White Motor Co., Murray-Ohio Mfg. Co. and Bender Body Co. were among those forced to suspend operations.

## Hot Dip Galvanizers Meeting on Aug. 24-25

PITTSBURGH—The American Hot Dip Galvanizers Association, Inc., will hold its semi-annual meeting at Hotel Statler, Cleveland, Aug. 24 and 25. I. M. Herrmann, Acme Galvanizing, Inc., Milwaukee, and president of the association, will open the technical session at 10.00 a.m. The following papers will be presented: "Grief in the Galvanizing Shop," by J. B. Tate, Witt Cornice Co., Cincinnati; "Temperature Regulation," by Clem Stein, International Stacey Corp., Columbus, Ohio, and "Aluminum in Hot Dip Galvanizing Baths," by W. G. Imhoff, technical director of research of the association, who will also present a report on "Embrittlement of Malleable Iron Castings."

A discussion of certain statistics dealing with galvanizing shops will follow, with special emphasis on dross accumulations in the bath over a period of time, and the proper method of determining such accumulations. Following a luncheon, a business session will convene and in the evening

members and guests will attend a cocktail party and banquet.

A board of directors meeting will take place in the morning of Aug. 25 with the afternoon devoted to entertainment. Invitations to members of the industry who are not members of the association have been extended for the technical sessions and the banquet. Stuart J. Swensson, secretary of the association, is located in the American Bank Bldg., Pittsburgh.

## Iron & Steel Engineers See 5000 Attendance

PITTSBURGH—More than 5000 steel mill engineers and executives are expected to attend the Association of Iron and Steel Engineers 35th annual convention and exposition at the William Penn Hotel here Sept. 26-29. A comprehensive technical program with 25 papers will feature the convention.

The Iron and Steel Exposition, a feature, will be housed under the same roof as the technical sessions. More than 100 steel mill equipment manufacturers have contracted for 20,000

sq. ft. of space. New developments to be exhibited at the exposition will cover almost every phase of steel mill operation and maintenance.

Members and guests of the Iron and Steel Engineers, while at the convention, will visit the Irvin works, Carnegie-Illinois Steel Corp. on Sept. 27, and Carnegie's Edgar Thomson works on Sept. 29.

## National Steel Quarterly Profit Is \$1,958,755

NATIONAL STEEL CORP. showed a profit of \$1,958,755 in the June quarter, after taxes, interest and depreciation, equal to 89c. a share, compared with 46c. a share in the June quarter of last year or \$1,005,863. First quarter earnings this year totaled \$2,426,669 or \$1.10 a share.

## Wheeling Earns \$939,995 In Second Quarter

WHEELING STEEL CORP., Wheeling, W. Va., reports net profit of \$939,995 for the quarter ending June 30, 1939, compared with net loss of \$624,888 for the corresponding 1938 quarter. For six months ending June 30, 1939, Wheeling Steel reports a net profit of \$1,768,656 compared with net loss of \$1,155,923 for the six months ending June 30, 1938.

## House Approves Barter Measure

WASHINGTON—The last deficiency appropriation measure, expected to contain a \$12,000,000 item for purchase of strategic and critical war materials, is being drafted by a House deficiency appropriation subcommittee. President Roosevelt had recommended a \$25,000,000 appropriation for purchasing materials during the current fiscal year.

Meanwhile, the House passed a Senate-approved measure to authorize the Commodity Credit Corp. to barter cotton and other products for strategic war materials produced in other countries.

## Large Deposits of Iron Ore Are Discovered in India

LONDON—Valuable new deposits of iron ore have been discovered in Bastar State, Eastern India. The extent of the deposits is estimated at at least 610,000,000 tons of first-class ore. Fresh coal finds have also been made in Assam, estimated at 80,000,000 tons.

## REINFORCING STEEL

*Awards of 8,450 tons; 5,965 tons in new projects.*

### ATLANTIC STATES AWARDS

1550 Tons, Hornell, N. Y., channel improvement and bridges, to Sweets Steel Co., Williamsport, Pa., through Spencer & Ross, contractors.

950 Tons, New York, Manhattan Plaza, Contract 12A, to Bethlehem Steel Co., Bethlehem, Pa., through George J. Atwell Co.

750 Tons, Wilmington, Del., hospital, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Elmira, N. Y., State reformatory, to Recon Construction Co., Buffalo.

350 Tons mesh, Fairfield-Trumbull, Conn., State road, to American Steel & Wire Co., Worcester, Mass.; New Haven Road Construction Co., Inc., Hamden.

300 Tons, Westmoreland County, Pa., section 2C, Pennsylvania Turnpike, to Ft. Pitt Bridge Works Co., Pittsburgh, through Baldwin Bros., Cleveland.

200 Tons, Kearney, N. Y., approach piers, route 25, section B, to Truscon Steel Co., Youngstown, through Ole Hanson, Ventnor, N. J., contractor.

140 Tons, Harrisonburg, Va., post office and court house, to West Virginia Rail Co., Huntington, W. Va., through A. Parnell Blair, contractor.

125 Tons, Brooklyn, Shore Parkway, Contract SS-39-6, to Igou Bros., Newark, N. J., through Turecana Contracting Co.

100 Tons mesh, South Windsor, Conn., State road, to American Steel & Wire Co., Worcester, Mass.; Lane Construction Co., Meriden, Conn., contractor.

100 Tons, Springfield, Mass., floodwall, Contract D, to Bethlehem Steel Co., Bethlehem, Pa., through Charles I. Hosmer, contractor.

### CENTRAL AND WESTERN STATES

850 Tons, Little Rock, Ark., reservoir, U. S. Engineers, to Sheffield Steel Corp., Kansas City, through Mitty Bros., Los Angeles.

585 Tons, San Francisco Outer Mission

Juniper High School, to Bethlehem Steel Co., San Francisco; through Anderson & Ringrose, San Francisco, contractors.

477 Tons, Los Altos, Cal., cement plant clinker storage and slurry tanks, to San Jose Steel Co., San Jose, Cal., through E. W. Heple, San Jose, Cal., contractor.

400 Tons, Santa Cruz, Cal., silos for Santa Cruz Portland Cement Co. plant, to Gunn Carle & Co., San Francisco; through Dinwiddie Construction Co., contractor.

295 Tons, Schofield Barracks, T. H., gun battery Barracks, to Columbia Steel Co., San Francisco.

250 Tons, Gary, Ind., pump and blower house, to Concrete Steel Co.

211 Tons, Santa Monica, Cal., apartment house, to Soule Steel Co., Los Angeles.

164 Tons, Sterling, Ill., bridge, to Calumet Steel Co., Chicago.

150 Tons, Chicago, vocational school, to Calumet Steel Co., Chicago.

### PENDING REINFORCING BAR PROJECTS

#### ATLANTIC STATES

3000 Tons, New Ellenville, N. Y., Lackawack Dam, Mason & Hanger Construction Co., New York, low bidder (previously reported).

1000 Tons, Philadelphia, housing project at 25th and Tasker Streets; Turner Construction Co. low bidder on general contract.

800 Tons, New York, Paedegat Basin bridge; P. J. Carlin, low bidder.

125 Tons, Dayton, Ohio, dynamometer laboratory, Wright Field; Simpson Construction Co., Chicago, low bidder.

100 Tons, Cleveland, Glenville School.

#### CENTRAL AND WESTERN STATES

1337 Tons, Pollock, Cal., Central Valley project; bids Aug. 8 by Bureau of Reclamation.

1000 Tons, New Orleans, housing project; George A. Fuller Construction Co., Washington, low bidder on general contract.

395 Tons, Mono County, Cal., Los Angeles Department of Water and Power conduit (Specification 2952, Alternate A); bids Aug. 10.

211 Tons, San Francisco, George Washington High School auditorium; De Luca and Sons, San Francisco, low bidder on general contract.

about 200,000 ft. of pipe. Cost over \$175,000.

**General Gas Pipe Line Corp.**, Circle Tower Building, Indianapolis, has secured permission to reinstate application to Federal Power Commission, Washington, for authority to build new 20-in. welded steel pipe line from gas field district, Hart County, Ky., to connection with present lines in Hamilton County, Ind., about 180 miles, for natural gas transmission. Hearing on application is scheduled for Sept. 7.

**United States Engineer Office**, Fort Peck, Mont., closes bids Aug. 4 for 1000 ft. of 1½ in., 1000 ft. of 1¼ in., 2000 ft. of 1-in., and 2000 ft. of ¾-in. black, standard weight, seamless or welded steel pipe; also for 200 ft. of 2½ in., 100 ft. of 1½ in., 100 ft. of 1¼ in., 100 ft. of 1-in., and 100 ft. of ¾-in. black seamless or welded extra strong steel pipe (Circular 16).

**Shell Oil Co.**, Shell Building, St. Louis, plans welded steel pipe line from Denver and Bennett oil field areas, Yoakum County, Tex., to Hobbs, N. M., about 33 miles, for crude oil transmission. Connection will be made with main pumping station and pipe line system of company at latter place. Work will be carried out by Shell Pipe Line Corp., last noted address.

### Home Construction Trebled at Toledo

**RESIDENTIAL** construction in the first six months at Toledo, Ohio, was three times greater than that of the comparable period of 1938. Total contracts placed in the first half of 1939 amounted to \$3,557,000 as contrasted with \$1,149,000 in the first half of 1938.

## . . . GREAT BRITAIN . . .

*Government orders add to production in Britain.*

**LONDON**, Aug. 1 (By Cable)—Additional releases of Government orders for armament and defenses are enforcing a further increase in steel output in Great Britain and delays in deliveries on new business on some materials are now eight to 10 weeks.

Semi-finished steel supplies are still inadequate and there has been a further increase in imports under the cartel agreement.

Sheet mills are fully employed to the maximum capacity until the end of the year.

Merchant shipbuilding is striding ahead with steel makers receiving specifications regularly.

Foundry pig iron is still neglected, but hematite is active with large domestic sales to the end of October with subsequent substantial reductions in stocks. The huge output of basic iron is all going directly into consumption.

The Continent reports an increasing interest in commercial business, especially in Holland, Scandinavia, Finland and South Africa. Japan is still buying semi-finished steel.

Official prices are unchanged, but concessions have been made in markets where America is competing.

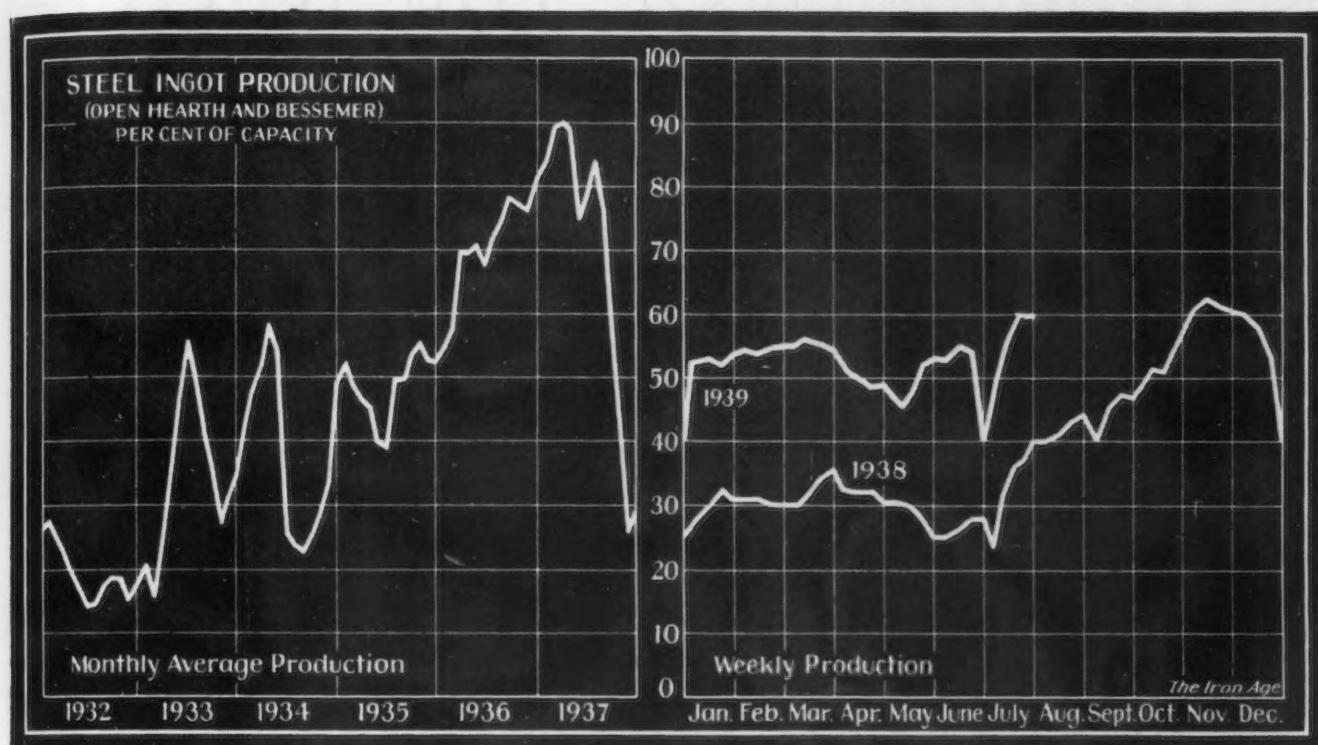
Welsh tin plate is active, especially for home trade where consumers are still buying on Government advice to lay in food supplies. Export demand is moderate for shipments to the end of the year. Total bookings are about equal to production, which is around 75 per cent.

Most galvanized mills are unable to accept any new commercial orders, being sold for many months on air raid shelters. So far nearly 1,000,000 shelters have been supplied householders who are entitled to receive them free.

### Navy Awards Contracts For Tools, Materials

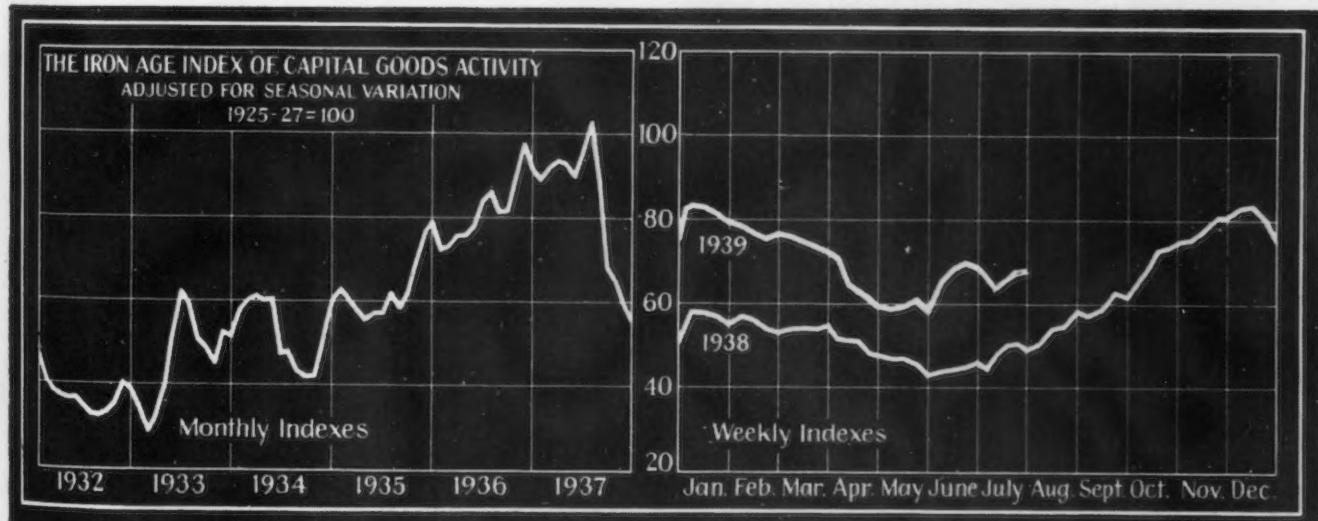
**WASHINGTON**—The Bureau of Supplies and Accounts, Navy Department, has awarded contracts to the following companies: Rockford Machine Tool Co., Rockford, Ill., hydraulic shapers and equipment; Rhode Island Tool Co., Providence, bolts, \$7,317; Pittsburgh Screw & Bolt Corp., Pittsburgh, bolts, \$11,892; The International Nickel Co., Inc., New York, nickel, \$13,440; and the Mine Safety Appliances Co., Pittsburgh, portable power tools, \$14,687.

## Ingot Production Continues at 60%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Philadelphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	51.0	56.0	55.0	42.0	70.0	59.0	77.0	62.0	75.0	40.0	57.0	49.5	45.0	60.0
PREVIOUS WEEK..	51.0	56.0	52.0	41.0	70.0	51.5	77.0	62.0	82.0	40.0	57.0	49.5	45.0	60.0

## Another Small Gain Recorded by Capital Goods Index



FOR the third week since the dip in the holiday week, THE IRON AGE index of capital goods activity has made a gain, but the rate of climb last week was only at about half the rate of the preceding two weeks. Standing at 67.1, the current figure for the week ended July 29 is still below the previous peak of 69.9, recorded for the week ended June 24, but is well above the low point of the year, 59.1, recorded on May 13. Automobile production was the only factor in the past week to show a decline—less than the seasonal average, however. In actual dollar volume engineering construction awards showed a loss both for the week and for the 13-week moving average used in computing the index. Seasonal adjustment, on the other hand, resulted in no change in the final figure. Almost all

the gain in the Pittsburgh index was in the production factor. Forest product carloadings showed a gain of 3½ per cent over the preceding week. Biggest single gain was in steel production.

	Week Ended	Week Ended	Comparable
	July 29	July 22	1938 1929
Steel ingot production <sup>1</sup> .....	85.5	81.8	52.1 139.7
Automobile production <sup>2</sup> .....	44.9	47.9	35.6 134.7
Construction contracts <sup>3</sup> .....	67.7	67.7	62.3 123.4
Forest products carloadings <sup>4</sup> .....	62.2	59.3	50.3 125.4
Production and shipments, Pittsburgh District <sup>5</sup> .....	75.4	74.3	50.8 130.0
Combined index .....	67.1	66.2	50.2 129.5

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh.

# SUMMARY OF THE WEEK

... Ingot production holds at 60 per cent; pig iron output up 7.6 per cent.

... July steel business slightly above the June totals.

... Pipe lines of 38,000 tons and 21,300 tons for Navy placed.

**O**PTIMISM continues to grow among steel producers. Ingot production this week holds at about 60 per cent and pig iron output in July (daily average) gained 7.6 per cent over June. Only the retarding influence of the General Motors strike, which is delaying work on its new models, has prevented a higher operating rate for steel this week.

There have been gains in production in the Buffalo and Youngstown districts and Southern Ohio operations will move upward late this week with partial resumption of steel making at the Middletown plant, which has been idle during installation of a new blooming mill. Several companies are operating above 60 per cent, a few above 70 per cent.

An estimate of pig iron production in July, which is subject to revision when final figures have been completed, shows a total output last month of 2,356,000 gross tons compared with 2,118,451 tons in June. Based on the daily average of 76,000 tons in July, there was a gain of 7.6 per cent over the June daily average of 70,615 tons. There were 127 furnaces in blast on Aug. 1, a net gain of nine over the 118 that were in blast on July 1. Eleven furnaces went in during the month and two were blown out or banked. The present number of active furnaces is the largest since Nov. 1, 1937, when 151 were in service.

**S**TEEL bookings in July were moderately better than those of June, which for some companies was the second best month of the first half, March having led.

Automobile companies other than General Motors are making rapid strides toward the bringing out of 1940 models. Three press previews of new cars are now scheduled for the first half of August. The Ford Motor Co. has ordered 50,000 tons of steel and will need twice that much for initial production of new cars. Meanwhile motor car assemblies are tapering off and the low point will be reached either this week or next, with a rising trend to come probably before the end of August.

Although the placing of steel tonnages for public building construction may not be quite as brisk from now on, any deficiency in that category probably will be more than made up by the increased requirements of the automobile industry. More-

over, tin plate production has gained four points to 69 per cent, the increase at this time pointing to the care with which can makers have been watching inventories of tin plate.

A sudden spurt in the placing of line pipe by oil companies is a welcome indication in an industry that has been laggard in its steel purchases this year. The Standard Oil Co. of Indiana has bought two lines totaling about 660 miles or about 38,000 tons of seamless pipe, one line for crude oil to be laid from Salt Lake City to Fort Laramie, Wyo., and the other a gasoline line from Sugar Creek, Mo., to Council Bluffs, Iowa. The Shell Union Oil Co. has purchased about 4500 tons of seamless pipe for a line in the East. A natural gas line requiring about 27,000 tons of 16-in. pipe is pending.

Inquiries for structural steel and reinforcing bars do not bulk as large as recently, but the week's awards of fabricated structural steel reached the sizable total of more than 25,000 tons, of which 10,200 tons is for a bridge at Woodbridge, N. J., and 4200 tons for a school in Chicago.

The Navy Department has awarded 21,300 tons of plates, sheets and strip for two 45,000-ton battleships under construction in Navy yards.

**E**XPORT trade is one of the strong features of current steel demand. Abrogation of the trade treaty with Japan will have little, if any, effect on purchases by Japan of essential materials in the United States, according to well-informed opinion. Japan has recently diverted some purchases elsewhere, such as pig iron to India and Australia, but she has nowhere else to turn for iron and steel scrap in the quantities she requires and she is also dependent on the United States for some steel, although her capacity in recent years has been increased from 2,000,000 to 5,000,000 tons annually, thereby cutting down her imports. Neither Germany nor Great Britain is in a position to export the machine tools that Japan requires. Japan's purchases of airplanes and parts in this country have also been important. Abrogation of the treaty, however, prepares the way for possible restriction of scrap exports next year through imposition of a licensing plan. Meanwhile Japanese commercial interests believe that a solution will be found within the six-months period so that trade relations will not be disturbed.

**W**ITH the exception of reinforcing bars, there has been a further strengthening of prices on steel products. Concessions have not disappeared on plates and shapes, but there are more sales at the full published prices. It now appears that some consumers underestimated their sheet and strip requirements during last May's buying spree and have tried to add to their low-priced commitments without success. Quite a number of small sales have been made at the present published levels.

Steel scrap prices are up slightly at Pittsburgh, are strong at Chicago and up 50c. at St. Louis and \$1 at Buffalo. THE IRON AGE scrap composite price is 4c. higher at \$15.17.

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

## Rails and Semi-finished Steel

	Aug. 1, 1939	July 25, 1939	July 3, 1939	Aug. 2, *1938
Per Gross Ton:				
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Re-rolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

## Finished Steel

	Aug. 1, 1939	July 25, 1939	July 3, 1939	Aug. 2, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Clayton	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middlestown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middlestown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middlestown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middlestown	3.05	3.05	3.05	3.20

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

## The Iron Age Composite Prices

### Finished Steel

Aug. 1, 1939	2.236c. a Lb.
One week ago	2.236
One month ago	2.236
One year ago	2.300

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

### High

1939.....	2.286c., Jan. 3	2.236c., May 16
1938.....	2.512c., May 17	2.211c., Oct. 18
1937.....	2.512c., Mar. 9	2.249c., Jan. 4
1936.....	2.249c., Dec. 28	2.016c., Mar. 10
1935.....	2.062c., Oct. 1	2.056c., Jan. 8
1934.....	2.118c., Apr. 24	1.945c., Jan. 2
1933.....	1.953c., Oct. 3	1.792c., May 2
1932.....	1.915c., Sept. 6	1.870c., Mar. 15
1931.....	1.981c., Jan. 13	1.883c., Dec. 29
1930.....	2.192c., Jan. 7	1.962c., Dec. 9
1929.....	2.223c., Apr. 2	2.192c., Oct. 29
1928.....	2.192c., Dec. 11	2.142c., July 10

### Low

1939.....	\$23.25, June 21	\$19.61, July 6
1938.....	23.25, Mar. 9	20.25, Feb. 16
1937.....	19.73, Nov. 24	18.73, Aug. 11
1936.....	18.84, Nov. 5	17.83, May 14
1935.....	17.90, May 1	16.90, Jan. 27
1934.....	16.90, Dec. 5	13.56, Jan. 3
1933.....	14.81, Jan. 5	13.56, Dec. 6
1932.....	15.90, Jan. 6	14.79, Dec. 15
1931.....	18.21, Jan. 7	15.90, Dec. 16
1930.....	18.71, May 14	18.21, Dec. 17
1929.....	18.59, Nov. 27	17.04, July 24

### Pig Iron

\$20.61 a Gross Ton
20.61
20.61
19.61

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

### Steel Scrap

\$15.17 a Gross Ton
15.13
14.71
14.33

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

# THIS WEEK'S MARKET NEWS

## NEW BUSINESS

*... Automotive specifications better . . . Ford buys 50,000 tons*

ALONG with better specifications from all automobile companies, the Ford Motor Co. has placed orders for 50,000 tons of steel for 1940 models, it was announced by a company spokesman, who added that this was about half of the amount that will be required for initial production of new cars. When the inquiry was issued a few weeks ago the requirements were estimated at 75,000 tons. It is stated in DETROIT that price was not a factor in the placing of the tonnage as the company is known to have received the quotations that were available to all automobile companies last May, when commitments were made by motor car companies for their 1940 model requirements.

Steel specifications during July in the PITTSBURGH district ran from 2 to 12 per cent ahead of June on a daily basis, depending on the company and product involved. Total specifications were slightly in excess of the June experience, which is considered an exceptionally good showing in view of the holidays and the usual seasonal influences. While the tempo has slowed up slightly in the past week or so, no marked decline in new business is expected. Miscellaneous demand is holding up and is well diversified. Automotive releases are increasing, with the exception of those from plants tied up by union disputes. Structural steel, tin plate and hot rolled bar tonnages are expected to continue at recent levels over the next several weeks.

Miscellaneous buying still dominates the CHICAGO district, where operations are unchanged from last week at 56 per cent, with no signs of a decrease apparent. Releases from DETROIT, though slightly greater, are not yet important enough to be regarded as a major factor. Strong support from the farm equipment and farm tractor makers is expected in September and October, but is not now present. Railroads are contributing almost nothing to the sustenance of current rates. Bookings at CHICAGO sales offices during July ran from about the same as June to 4 per cent ahead.

While the foundation of current demand in CLEVELAND is still the miscellaneous consumer, the automobile parts industry is accounting for a

larger share of both sales and shipments. Releases from this source in the past week included bumper and tappet stem stock as well as material for the cold finishers. Farm implement makers continue to specify freely. The UAW strike at the Fisher Body plant in CLEVELAND has disrupted activities at practically every automobile parts plant in the district, but general opinion is that a settlement of the strike is not far off.

Aggregate July business in CLEVELAND showed a slight improvement over June, as against a usual easing in demand. The outlook for August, assuming there is an early settlement of the automobile strikes, is very bright.

A marked increase in miscellaneous orders and heavier demands from automotive companies for the 1940 models have been reported by BUFFALO mill officials as the chief causes of expansion of operations there. Three bar mills at one plant will be operating near capacity for the first time since last fall. Strip sheet production is also said to be the heaviest since that time. Shape and reinforcing bar projects are beginning to wane but substantial tonnages are yet on the books.

While new business in the ST. LOUIS district is light, it has shown a slight improvement, and generally there has been a stronger sentiment that business for the remainder of the year will be better than it was in the first half.

## PRICES

*... Mills continue their efforts to strengthen quotations*

ALTHOUGH price concessions have not disappeared, the steel price situation has been steadily improving in recent weeks. Producers are confining their efforts to a restoration of the quotations that were officially announced as effective for the third quarter and apparently have given no serious thought to any increases for the fourth quarter. However, some buyers have attempted to obtain coverage to the end of the year at present prices and have been turned down.

In sheets and strip most of the shipments are at the prices at which a large volume of business was booked last May, but it appears that some consumers underestimated their re-

quirements at that time and have attempted to obtain additions to their commitments; it is stated by a number of mills that such efforts have been unsuccessful. While shipments to automobile companies at the low prices will continue until the end of the year, it is likely that much of the tonnage booked from general consumers will have been rolled and shipped by the end of this quarter. Quite a good many small orders have been booked at the current sheet and strip quotations.

Plates and shapes are products in which there is still room for improvement as to prices. However, mills are now getting 2.10c. a lb. for plates in a good many instances if no fabrication-in-transit is involved.

Prices for merchant bars and wire products have become much firmer, though reinforcing bars continue weak.

The new quantity set-up on hot rolled bars is generally favored by producers, though some small jobbers have made objections. Some of these jobbers are in the habit of ordering mixed carloads of a few tons of a size, on which their increased costs will be \$4 or \$5 a ton.

## STEEL OPERATIONS

*... Rate for industry unchanged this week at 60%*

INGOT production for the current week is estimated by THE IRON AGE at 60 per cent, unchanged from last week. Some districts, in fact, are operating at higher rates than a week ago. The only important district to show a loss is BIRMINGHAM, where 16 open hearths are in operation against 18 last week.

Gains have occurred at BUFFALO, which is up several points to 59 per cent; at YOUNGSTOWN, which has gained three points to 55 per cent, and in SOUTHERN OHIO, where the Middletown plant of the American Rolling Mill Co., idle during July, will resume partially the middle of this week.

In the PITTSBURGH district the rate is unchanged at 51 per cent; the CHICAGO rate is likewise unchanged at 56 per cent; WHEELING-WEIRTON remains at 77 per cent.

There is a possibility of a decrease in the rate at DETROIT if the General Motors strike is not speedily settled.

## PIG IRON

*... General Motors strike retards ordering for 1940 model castings*

DELAY in ordering castings for 1940 automobiles, due in part to the General Motors strike, has retarded the ordering of pig iron by automotive foundries. However, furnaces which serve that trade shipped about as much iron in July as in June, which points to the possibility that August shipments may exceed those of the past month.

In the PITTSBURGH district last month's shipments were slightly in excess of those of June, while in the CLEVELAND area they were about equal to those of June. At ST. LOUIS there has been an increase in releases as a result of increased activity among agricultural machinery and implement manufacturers, two sales of 1200 tons each having been made there. In the NEW YORK district the placing of a few contracts for delivery over the remainder of this quarter has led some sellers to believe that the period of extreme hand-to-mouth buying is over.

Although the present pig iron situation does not warrant too much optimism, there is a widespread feeling in the trade that a period of considerably greater activity is opening up. It is believed that the market may be strengthened by two factors: 1. The use of more pig iron by steel companies as steel scrap prices remain at fairly high levels, and 2, the possibility of increased exports of iron because of inability of some European countries to supply the demand abroad.

Among the domestic consumers who are expected to take more iron during the next several months are automotive and agricultural machinery foundries, heater manufacturers and soil pipe makers, who are affected by the steady construction of small homes, and foundries making machine tool castings.

The improved situation in the cast iron pipe trade is illustrated by the situation at the plant of the Warren Foundry & Pipe Corp., Everett, Mass., which has recently stepped up operations to six days a week and overtime. A month ago the foundry was operating five days a week. The company has a substantial backlog and is about two weeks behind on deliveries. The Everett plant this year has broken all previous records for bookings and shipments.

A foundry in New England making machine tool castings has stepped up operations to six days a week.

## WAREHOUSE BUSINESS

*... Orders hold at June level or better*

PITTSBURGH warehouse interests report that July business was slightly in excess of that booked in June. The average run of orders is fairly well diversified both as to products and consumers. Recent activity has been a little bit better than was expected but sellers look for no marked change in the trend either upward or downward over the next several weeks. Prices are holding fairly well with the exception of hot rolled bars.

AT CLEVELAND, warehouse tonnage during July was closely comparable to that of June, in some instances slightly ahead of June. Due to the new mill quantity extras on hot rolled bars, and with cutting extras higher, costs to the warehouses may be increased by \$4 to \$5 per ton, which will doubtless be reflected in quotations for warehouse customers.

PHILADELPHIA warehouses report sales as being fairly satisfactory, the volume showing little alteration over the past several months. No price action has been taken on bar grades and none is likely in the near future, although protective advances are expected when current inventories run low.

BUFFALO warehousemen report July as the best month of the year to date. Heavier lines including shapes, plates and bars have all seen greater activity.

## REINFORCING BARS

*... Buying light ... Price irregularity reappears*

PRODUCERS remain optimistic concerning the volume of business still pending but prices have again become spotty with some jobs being taken substantially below the published levels.

Sweets Steel Co., Williamsport, Pa., has been awarded 1550 tons of bars for channel improvement and bridges at Hornell, N. Y., and Bethlehem Steel Co. will furnish 950 tons for contract 12A, Manhattan plaza, New York. An award for 850 tons of bars for a Government reservoir at Little Rock, Ark., went to Sheffield Steel Corp. Philadelphia housing project will require 1000 tons of material, while a large amount of work is pending in the CHICAGO area.

## SHEETS AND STRIP

*... Specifications are gaining ... Automotive requirements larger*

TOTAL sheet bookings at PITTSBURGH in the past week were up slightly over the week before. In the aggregate, bookings in July were only slightly less than the volume of specifications placed in June. During the early part of July, miscellaneous requirements supported the total volume of business and, although that type of consumption has tapered off some in the past few weeks, automobile specifications have picked up.

A surprising feature of the current sheet and strip picture is that the miscellaneous demand is very widely diversified, with the total volume of sheet releases showing little or no change from week to week. Equally important is the disclosure that many moderate sized sheet and strip accounts have used up their entire commitments placed in May, indicating that in many cases consumer business has been much better than was expected a few months ago. There is no disposition on the part of steel producers to add to commitments which have been used up. Meanwhile, producers look for substantial improvement in releases from the automotive industry in the near future.

The continuance of the tool makers' strike against General Motors has affected shipments to that company considerably, but despite the labor difficulties some automobile parts makers in CLEVELAND are going into production on 1940 parts on a small scale and issued releases for the required steel in the past week. It is estimated that between 80 and 90 per cent of present ordering is against low priced blanket contracts, but some new business has been placed recently at full prices. CLEVELAND sales officials are of the opinion that consumption is running well ahead of estimates made a month ago and believe that specifications on most of the low priced material will be received by Sept. 1 to be shipped by Sept. 30. This applies primarily to miscellaneous consumers as deliveries to the automobile plants will run well beyond that date.

CHICAGO sheet mills report a slight increase in releases from DETROIT, but the big demand is yet to come. Miscellaneous consumers of sheets are still the important factors in this market. The sheet and tin mills of one CHICAGO district mill are scheduled this week for 90 turns, up seven from last week, and the highest point in six weeks.

A small improvement in sheet bookings from all sources was noted in the SOUTHERN OHIO district the past week. Most prominent in the upward trend was the automotive industry.

Some sellers in the PHILADELPHIA area have pretty well liquidated low price orders taken last May, but other mill representatives state that a considerable volume of this type of business still remains on the books. These latter, however, expect heavy releases before the month's end, at which time local automobile stamping plants will be operating at a considerably accelerated pace.

Sheet specifications received during July by NEW YORK district sales offices were spotty as to volume. For most sellers they ran under the June volume, by as much as 40 per cent in one instance. On the other hand, one seller who made little effort to bring in specifications in June did substantially better in July. New business was very small.

## PLATES

*... Navy awards, pipe projects and miscellaneous business support market*

PLATE specifications at PITTSBURGH have leveled off recently but the decline is not significant. July bookings were about 5 to 10 per cent under June business.

Demand from miscellaneous consumers in the CLEVELAND area continues fairly active, but lack of important railroad support is keenly felt. Crane, steam shovel and railroad equipment makers were particularly active in the past week.

Briggs Boiler Works, Akron, Ohio, has been awarded a contract for 10,200 ft. of 72-in. pipe for a water works project in Toledo. About 2800 tons of plates will be required.

Tank builders, structural fabricators and makers of road machinery and other heavy industrial equipment are providing the CHICAGO market with fairly good tonnages.

Toward the end of the month, plate prices stiffened in the NEW YORK selling area but there was no real test of the market since most of the tonnages were small. Earlier in the month, concessions of \$3 a ton and over were prevalent on contracts of several hundred tons or more. Business for the month compared favorably with June and was much ahead of July, 1938, but the total bookings on a tonnage basis were still rather small.

The Navy Department has awarded 17,200 tons of plates for battleships. Details will be found under "Shipbuilding" heading.

## SEMI-FINISHED STEEL

*... Specifications have increased moderately*

TOTAL semi-finished steel specifications at PITTSBURGH in the past week increased moderately from the week before and orders booked during July were in substantially the same volume as June business. Specifications for sheet and tin bars are expected to be fairly regular during the next several weeks while a moderate pick-up is anticipated as soon as automobile companies increase specifications from non-integrated plants.

## BOLTS AND NUTS

*... Quotations to jobbers being restored to April 1 level*

Bolt and nut companies in CLEVELAND have followed the lead of the Eastern producer who last week raised quotations, effective Aug. 1, to jobbers to the level prevailing on April 1. This revision is equal to an advance of from 9 to 11 per cent as compared with discounts given to jobbers in July, which in some cases resulted in prices below actual production costs. Consumer prices are not expected to be altered. Aggregate orders in July in CLEVELAND were about 25 per cent above those of June.

## RAILROAD BUYING

*... Missouri Pacific to provide for purchases by trust agreement*

The Missouri Pacific Railroad Co. has made application to the Interstate Commerce Commission for permission to enter into an equipment trust agreement with the New York Trust Co., under which the latter would acquire approximately \$3,977,000 worth of equipment to be leased to the road. Under the agreement the following companies would build the equipment at the contract prices noted:

Mt. Vernon Car Mfg. Co., 1000 50-ton all-steel gondola cars, \$2,317,944; American Car & Foundry Co., two streamlined trains of six cars each \$728,053; Electro-Motive Corp., two streamlined trains \$357,650, one 1000-hp. diesel switching locomotive \$84,881, two 900-hp. diesel switch-road

locomotives \$195,700, and two 600-hp. diesel switching locomotives; Baldwin Locomotive Works, one 1000-hp. diesel switching locomotive \$79,950; American Locomotive Co., one 1000-hp. diesel switching locomotive \$84,881. These awards were announced some time ago.

The Federal Court at St. Louis has authorized the Missouri Pacific Railroad to advance \$150,000 to its subsidiary, Missouri Pacific Transportation Co., with which to purchase 20 buses of 25-passenger capacity each.

## MERCHANT BARS

*... July bookings equal to or better than June volume*

HOT rolled bar specifications at PITTSBURGH were off slightly in the past week but July bookings were equivalent to the volume placed in June. Bar specifications are expected to increase moderately because of recent quantity and other extra revisions. The increase in specifications is expected to emanate from those customers who are covered by contracts for third quarter shipments. The revisions became effective immediately on all new business not covered by contract.

Fairly heavy buying by some implement makers and their parts suppliers, assisted to a small degree by automobile parts makers, created a slight bulge in sales in CLEVELAND in the past week. Total bookings in July ran well ahead of those of June.

Increased tonnage from the makers of tractors and implements is expected in September and October by CHICAGO mills. During August and into the fall, specifications should be received in good volume from automobile manufacturers.

In the PHILADELPHIA territory all warehouses and jobbers have registered definite dissatisfaction with the new bar extras put into effect July 15.

## STRUCTURAL STEEL

*... Bethlehem gets 10,200-ton New Jersey bridge award*

STRUCTURAL steel specifications are 10 per cent lower at PITTSBURGH than last week but July's total was only slightly under that of June. The largest award the past week was 10,200 tons to Bethlehem Steel Co. for the Raritan River bridge at Woodbridge-Sayreville, N. J. Duffin Iron

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Works, Chicago, will provide 4200 tons for a vocational school in the CHICAGO area where awards are less numerous. Twelve hundred tons of material for highway bridges, section 12A, Pennsylvania Turnpike Commission, will be supplied by Bethlehem and a similar amount for a Montgomery Ward & Co. building at Detroit will be furnished by Whitehead & Kales, Detroit.

Pending business includes 2500 tons for two Southern Pacific bridges near Shasta Dam, on which bids are due Aug. 7, and 2400 tons for the Midwood high school, Brooklyn. A new Pacific Telephone & Telegraph Co. building at Sacramento, Cal., will require 900 tons, and 3300 tons will be needed for a street improvement job at Pittsburgh.

## WIRE PRODUCTS

*... Specifications expand slightly  
... Export demand good*

A MODERATE increase in merchant wire specifications at PITTSBURGH materialized during the past 10 days, owing to the change in the extra list. All specifications were to be in producers' hands by midnight, July 31, shipment to be made at mill's convenience. Total wire bookings in July were under the volume booked in June, although the decline was not as great as that registered by comparing the early part of July with the corresponding June period. Heavier buying of manufacturers' wire is expected soon from automotive companies.

Revisions in nail extras encouraged a small amount of covering in CLEVELAND in the past week, but most resellers had stocked heavily during the weakness of a month ago. Incoming business in CLEVELAND is holding to the June level, featured by fairly heavy

demand from South American countries.

August is expected to result in increasing demand from CHICAGO district wire users who supply the automobile industry. In September and October makers of agricultural machinery expect higher sales, which will be reflected in production improvements. Renewed buying from farmers will be seen when the crops are in.

## SHIPBUILDING

*... 21,300 tons of steel awarded  
for two battleships*

CONTRACTS totaling approximately \$928,602 for 21,300 tons of steel for the two 45,000-ton battleships under construction were awarded in Washington on Tuesday by the Navy's Department's Bureau of Supplies and Accounts. Broken down, the tonnage includes 17,200 tons of black plates, 3400 tons of galvanized plates, 300 tons of black sheets, 125 tons of galvanized sheets, 200 tons of black strip and 75 tons of galvanized strip.

Central Iron & Steel Co., Harrisburg, Pa., received a \$395,400 contract for 9000 tons of steel consisting of 8500 tons of black plates, 300 tons of black sheets, and 200 tons of black strip to be divided equally between the two ships, one under construction in the Brooklyn Navy yard, the other in Philadelphia. Also ordered from the Harrisburg company were 2100 tons of galvanized plates costing approximately \$88,620, also to be divided between the two yards.

Thomas Gregory Galvanizing Works, Maspeth, N. Y., was awarded a \$58,302 contract for 1500 tons, including 1300 tons of galvanized plates, 125 tons of galvanized sheets, and 750 tons of galvanized strips, to be divided between the two yards.

## TUBULAR GOODS

*... 38,000 tons of seamless pipe  
placed for oil line*

TOTAL tubular sales in the PITTSBURGH district are virtually unchanged from recent averages with the exception of line pipe which has taken a sudden temporary spurt.

Standard Oil Co. of Indiana has purchased close to 660 miles of line pipe from National Tube Co., PITTSBURGH, with the total tonnage involved approximating 38,000 tons. The major portion of the order is 8-in. seamless with a small amount of 6-in. seamless. More than 440 miles of the tubing will be used by the Standard of Indiana's subsidiary, Utah Gulf Refining Co., Salt Lake City, for a crude oil line to run from Salt Lake City to Fort Laramie, Wyo. The rest of this order, which is the largest in several months, is expected to be utilized for a Standard of Indiana gasoline line to run from Sugar Creek, Mo., to a point near Council Bluffs, Iowa. Work on these pipe lines is being rushed in order to bring the project to completion as soon as possible.

The Shell Union Oil Co. recently purchased approximately 4500 tons of 6-in. seamless tube to be used for a short line in New England. This order was divided among Pittsburgh Steel Co., Jones & Laughlin Steel Corp. and National Tube Co.

## TIN PLATE

*... Operations higher at 69% ...  
Inventories closely watched*

WITH can makers holding stocks of tin plate to a minimum, demand has become closely attuned to ultimate requirements. As a result of this situation, orders have been slightly better in the past week, with the result that operations have climbed four points to 69 per cent.

## Weekly Bookings of Construction Steel

	Week Ended			Year to Date		
	Aug. 1, 1939	July 25, 1939	July 3, 1938	Aug. 2, 1938	1939	1938
Fabricated structural steel awards	25,150	19,150	21,250	28,120	605,875	409,175
Fabricated plate awards	4,130	870	2,380	1,040	99,335	80,385
Steel sheet piling awards	270	1,790	0	0	42,325	28,310
Reinforcing bar awards	8,450	11,535	9,800	2,800	290,700	164,025
Total Letting of Construction Steel	38,000	33,345	33,430	31,960	1,038,235	681,895

# IRON AND STEEL SCRAP

**A**UGUST 1.—There has been a greater amount of mill buying in the past week than in some time and prices have been boosted where such sales have taken place. As a result of a 6000-ton sale at Buffalo, for example, the principal grades have advanced 50c. to \$1. An equal tonnage of No. 2 steel and 1000 tons of cast iron sold to a St. Louis mill resulted in dealers advancing their buying prices 50c. a ton on many items. Detroit dealers have also advanced their buying prices, primarily because of the strong markets in other consuming centers, as have Cincinnati dealers. There have been no new sales at Cleveland or Youngstown, and at the latter point one mill is holding up the deluge of recent shipments.

A recent small tonnage sale at Chicago supports last week's quoted range on No. 1 steel and although material is relatively scarce around Philadelphia \$16 is still tops for No. 1 there. Some points in the Pittsburgh district are paying the equivalent of \$16.25 delivered for No. 1, justifying a spread of 75c. in the quoted range for this grade, advancing the average at Pittsburgh 12½c. over last week. On the basis of this change, THE IRON AGE composite has advanced to \$15.17, up 4c. from last week.

## Chicago

A mill purchase of a small lot of heavy melting steel at \$14 establishes this market firmly at the levels quoted last week, \$13.75 to \$14. Dealers are asking \$14 for steel at present, and brokers state that material is coming out slowly at \$13.75. It is not believed that brokers have yet paid as high as \$14 except perhaps in special instances.

## Pittsburgh

Despite the absence of important consumer buying in the past week, the market remains exceptionally strong. Broker prices on No. 1 heavy melting are ranging from \$15.50 a ton to as high as \$16 a ton, with the majority of transactions being closer to the \$16 side. Supplies are none too plentiful and competition among brokers is becoming keener. On the basis of current factors, and because some points in the district are paying at least equivalent to \$16.25 a ton for No. 1 steel into consumption, this grade this week is quoted at an unusual spread of 75c. making it \$15.50 to \$16.25 a ton. A rise of 12½c. a ton from last week's quotation. The balance between supply and demand is so fine that an unexpected consumer purchase might easily raise the market further.

## Philadelphia

With district steel making facilities operating at a considerably better pace than a month ago, all plants are actively seeking scrap supplies. Material is none too

plentiful, however, and the result has been both an upward trend in prices and a diminution of export shipments. Whereas no price changes on important grades are noted this week, the market is decidedly strong. One boat will complete loading today at Port Richmond and another boat is expected in tomorrow, but throughout the remainder of the month loadings will taper and the month's total will likely fall considerably under that for July.

## Cleveland

The undertone of the market here continues very firm, although supplies are noticeably more free than a month ago. Rising ingot rate is the chief contributing factor to present strength. There have been no new sales recently, nor any other developments that would justify altering present quotations. Railroad lists which will be out this week are expected to provide a clue to future trends.

## Youngstown

One large producer here is retarding shipments as supplies become more plentiful. One day last week there were 96 cars on track at a Valley plant, as compared with a normal 24. There has been no new mill buying in some time, although one local consumer is said to be considering adding to its commitments shortly. Sentiment continues very strong but an increase in available supplies brought about by the higher quotations is tempering bullishness.

## Buffalo

Approximately 6000 tons of scrap was purchased this week by the largest consumer in the district. Although the sale was made on the basis of \$14.50 to \$15 for No. 1 heavy melting steel, the bulk of the shipments will be composed of Nos. 1 and 2 bundles, due to the increasing scarcity of No. 1 steel in the area. At the same time another small sale of No. 1 heavy melting was made to another mill at a slightly higher price but within the same range. A third small sale of cast scrap was made at quoted prices.

## Cincinnati

The local iron and steel scrap market ruled stronger the past week, although mill buying is still more or less passive. Dealers are taking scrap and bidding 25c. on the average above the past week, bringing the entire list forward 2c. a ton. Return of Middletown unit of American Rolling Mill Co. to operation this week is expected and this should further strengthen the scrap market, although some material is reported moving to this interest regularly. Dealers hold material closely for better prices.

## St. Louis

An East Side steel mill having bought 6000 tons of No. 2 heavy melting steel and 1000 tons of cast iron at 50c. a ton higher than the preceding sale, the market for scrap iron was strengthened considerably and prices were higher. Shipments are to be made over the next 60 days. Selected heavy melting, No. 2 heavy melting and No. 1 railroad cast

are 50c. a ton higher; railroad malleable 75c. higher, and No. 1 heavy melting and No. 2 wrought 25c. up. Because of a strong demand from foundries for rail ends, dealers are paying 50c. a ton higher. For miscellaneous standard section rails. Railroad lists: Baltimore & Ohio, 4200 tons; New York, Chicago & St. Louis, 1800 tons; St. Louis-San Francisco, 300 tons, and Alton, 125 tons.

## Detroit

Foundries in the Detroit area, hard hit in the middle of the automotive die season by the General Motors strike of tool and die workers, have slowed down deliveries of foundry scrap to an extent that makes cast items on the list look weak in comparison. These prices are unchanged this week, while practically all other items have moved upward about 50c. a ton. Optimism is tempered by knowledge that the GM strike may have other bad effects and by the additional knowledge that the upward move of scrap prices in Detroit in the last two weeks was in the nature of an adjustment to other market areas in which prices had climbed.

## New York

The steady flow of material for export continues as this market is little affected by an increase in domestic demand. Reported authorization of the purchase of 600,000 quintals (27,000 gross tons) of scrap from the United States by the Italian Government does not represent new business and barely covers what is owed one exporter on old orders. Abrogation of the 1911 trade treaty with Japan has resulted in no new orders, but the Japanese are taking out scrap on old order more promptly. There is no change in buying prices.

## Boston

For Pittsburgh district delivery the going price on steel turnings is \$3.38 a ton on cars, but for Pennsylvania points elsewhere \$3.50 and in a few instances \$3.75. A moderate tonnage is moving. For breakable cast, Pennsylvania delivery, the market is firmer with \$10.15 a ton on cars the top. Machinery and textile cast quotations for foundry delivery are firmer because of exporters interest in such materials. Bundled skeleton remains quiet and unchanged at \$8.15 a ton on cars. The export market for No. 1 steel is generally \$14 a ton delivered dock, and active; for No. 2 steel, \$13 and not so active. Two boats are loading here and one at Providence. Local exports for June totaled 32,000 tons; those for July possibly will approximate June.

## Toronto

Dull trading featured the scrap markets for the past week. Bundled steel scrap is in steady demand and local dealers report good movement of this material. Also there is fair call for No. 1 heavy melting steel from the Hamilton mills, which are taking schedule delivery against contract. Dealers are making steady but small tonnage shipments of machinery cast. Stove plate is quiet with little demand and supplies light. Local dealers state there has been no improvement in scrap offerings and while sufficient scrap is reaching yards to take care of demand, supplies are by no means as big as they were earlier this year. Low prices continue to affect offerings.

## Iron and Steel Scrap Prices

### PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.50 to \$16.25
Railroad hvy. mltng.	16.50 to 17.00
No. 2 hvy. mltng. steel.	13.75 to 14.25
Scrap rails	16.50 to 17.00
Rails 3 ft. and under	17.50 to 18.00
Comp. sheet steel	15.50 to 16.25
Hand bundled sheets	14.50 to 15.25
Hvy. steel axle turn.	14.00 to 14.50
Machine shop turn.	9.00 to 9.50
Short shov. turn.	10.50 to 11.00
Mixed bor. & turn.	8.00 to 9.00
Cast iron borings	8.00 to 9.00
Cast iron carwheels	15.00 to 15.50
Hvy. breakable cast	12.50 to 13.00
No. 1 cupola cast	15.00 to 15.50
RR. knuckles & cplrs.	17.50 to 18.00
Rail coil & leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet crops	18.50 to 19.00
Low phos. punchings	17.50 to 18.00
Low phos. plate	16.00 to 17.00

### PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hydraulic bund.	15.00 to 15.50
Hydraulic bund. old.	12.00 to 12.50
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.00
Hvy. breakable cast	15.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00
Railroad malleable	16.00 to 17.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	17.50 to 18.00
Couplers & knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	12.00 to 12.50
Cast boring (chem.)	9.50 to 10.00

### CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$13.75 to \$14.00
Auto. hvy. mltng. steel	
alloy free	12.50 to 13.00
No. 2 auto steel	11.00 to 11.50
Shoveling steel	13.75 to 14.00
Factory bundles	12.75 to 13.25
Dealers' bundles	11.75 to 12.25
Drop forge flashings	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old	5.75 to 6.25
Rolled carwheels	14.50 to 15.00
Railroad tires, cut	15.00 to 15.50
Railroad leaf springs	14.50 to 15.00
Steel coup. & knuckles	14.50 to 15.00
Axle turnings	12.50 to 13.00
Coll springs	16.50 to 17.00
Axle turn. (elec.)	13.50 to 14.00
Low phos. punchings	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	6.50 to 7.00
Short shov. turn.	6.50 to 7.00
Machine shop turn.	6.50 to 7.00
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft.	16.00 to 16.50
Steel rails under 2 ft.	16.50 to 17.00
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agric. malleable	12.00 to 12.50

Per Net Ton	
Iron car axles	\$18.00 to \$18.50
Steel car axles	17.50 to 18.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	12.00 to 12.50
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast	11.00 to 11.50
No. 1 agric. cast	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	7.75 to 8.25
Brake shoes	9.50 to 10.00

### YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.25 to \$15.75
No. 2 hvy. mltng. steel.	14.25 to 14.75
Low phos. plate	16.50 to 17.00
No. 1 busheling	14.25 to 14.75
Hydraulic bundles	14.75 to 15.25
Machine shop turn	9.00 to 9.50

### CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	14.25 to 14.75
Light bund. stampings	11.00 to 11.50
Drop forge flashings	11.50 to 12.00
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	13.50 to 14.00
Steel axle turnings	10.50 to 11.00
Low phos. billet and bloom crops	18.50 to 19.00
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
No. 2 busheling	8.25 to 8.75
No. 1 cupola cast	15.50 to 16.00
Railroad grate bars	11.00 to 11.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.75 to 18.25
Rails for rolling	18.25 to 18.75
Railroad malleable	15.50 to 16.00
Cast iron carwheels	14.00 to 14.50

### BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Scrap rails	13.50 to 14.00
New hvy. b'ndled sheets	13.00 to 13.50
Old hydraul. bundles	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Machine shop turn.	6.00 to 6.50
Knuckles & couplers	15.00 to 15.50
Coil & leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Shov. turnings	7.00 to 7.50
Mixed bor. & turn.	7.00 to 7.50
Cast iron borings	7.00 to 7.50
No. 1 machinery cast	15.00 to 16.00
No. 1 cupola cast	14.50 to 15.00
Railroad springs	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Cast bor. & turn.	2.50 to 3.00
Machine shop turn.	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Steel car axles	17.00 to 17.50
No. 1 RR. wrought	9.75 to 10.25
No. 2 RR. wrought	11.50 to 12.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	11.75 to 12.25
No. 1 railroad cast	12.50 to 13.00
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

### ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:	
Selected hvy. melting	\$12.00 to \$12.50
No. 1 hvy. melting	11.50 to 12.00
No. 2 hvy. melting	11.00 to 11.50
No. 1 locomotive tires	12.25 to 12.75
Misc. stand. sec. rails	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Cast bor. & turn.	2.50 to 3.00
Machine shop turn.	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Steel car axles	17.00 to 17.50
No. 1 RR. wrought	9.75 to 10.25
No. 2 RR. wrought	11.50 to 12.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	11.75 to 12.25
No. 1 railroad cast	12.50 to 13.00
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

### CINCINNATI

Dealers' buying prices per gross ton at yards:	
No. 1 hvy. mltng. steel.	\$11.50 to \$12.00
No. 2 hvy. mltng. steel.	10.50 to 11.00
Drop forge flashings	8.25 to 8.75
New loose clippings	4.25 to 4.75
Busheling	3.75 to 4.25
Scrap pipe	4.25 to 4.75
Steel turnings	3.75 to 4.25
Cast borings	3.75 to 4.25
Machinery cast	14.00 to 14.50
Dealers cast	12.00 to 12.50
Stove plate	8.00 to 8.50

### BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$13.00
Scrap steel rails	\$13.50 to 14.00
Short shov. turnings	7.50
Stove plate	9.50
Steel axles	18.50
Iron axles	18.50
No. 1 RR. wrought	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	15.00
Tramcar wheels	14.50 to 15.00

### DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$11.00 to \$11.50
No. 2 hvy. mltng. steel	10.00 to 10.50
Borings and Turnings	5.75 to 6.25
Long turnings	5.75 to 6.75
Short shov. turnings	6.50 to 7.00
No. 1 machinery cast	13.00 to 13.50
Automotive cast	13.50 to 14.00
Hvy. breakable cast	9.50 to 10.00
Stove plate	8.00 to 8.50
Hydraul. comp. sheets	12.50 to 13.00
New factory bushel	11.00 to 11.50
Sheet clippings	8.25 to 9.25
Flashings	10.50 to 11.00
Low phos. plate scrap	12.00 to 12.50

### NEW YORK

Dealers' buying prices per gross ton on cars:	
No. 1 hvy. mltng. steel	\$11.00 to \$11.50
No. 2 hvy. mltng. steel	9.50 to 10.00
Hvy. breakable cast	10.50 to 11.00
No. 1 machinery cast	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	15.00 to 15.50
Shafting	15.00 to 15.50
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings	4.00 to 4.50
Cast borings	3.50 to 4.00
No. 1 blast furnace	3.50 to 4.00
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton delivered local foundries:	
No. 1 machn. cast	\$13.50 to \$14.00
No. 2 cast	10.50 to 11.00

\* \$1.50 less for truck loads.

† Northern N. J. prices are \$2 to \$2.50 higher.

### BOSTON

Dealers' buying prices per gross ton:	


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## PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

### SEMI-FINISHED STEEL

#### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

#### Per Gross Ton

Rerolling ..... \$34.00  
Forging quality ..... 40.00

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

#### Per Gross Ton

Open hearth or bessemer ..... \$34.00

#### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

#### Per Lb.

Grooved, universal and sheared ..... 1.90c.

#### Wire Rods

#### (No. 5 to 9/32 in.)

#### Per Gross Ton

Pittsburgh, Chicago or Cleveland ..... \$43.00  
Worcester, Mass. ..... 45.00  
Birmingham ..... 43.00  
San Francisco ..... 52.00  
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

### SOFT STEEL BARS

#### Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham ..... 2.15c.  
Detroit, delivered ..... 2.25c.  
Duluth ..... 2.25c.  
Philadelphia, delivered ..... 2.47c.  
New York ..... 2.49c.  
On cars dock Gulf ports ..... 2.50c.  
On cars dock Pacific ports ..... 2.75c.

### RAIL STEEL BARS.

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham ..... 2.00c.  
On cars dock Tex. Gulf ports ..... 2.45c.  
On cars dock Pacific ports ..... 2.70c.

### BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. ..... 1.80c. to 2.00c.  
Detroit, delivered ..... 1.90c. to 2.15c.  
On cars dock Tex. Gulf ports ..... 2.15c. to 2.40c.  
On cars dock Pacific ports ..... 2.50c.

### RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham ..... 1.70c. to 1.90c.  
Detroit, delivered ..... 1.80c. to 2.00c.  
On cars dock Tex. Gulf ports ..... 2.05c. to 2.25c.  
On cars dock Pacific ports ..... 2.35c.

### IRON BARS

Chicago and Terra Haute ..... 2.15c.  
Pittsburgh (refined) ..... 3.60c.

### COLD FINISHED BARS AND SHAFTING\*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary ..... 2.65c.  
Detroit ..... 2.70c.

\* In quantities of 10,000 to 19,999 lb.

### PLATES

#### Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.\*  
Philadelphia, del'd ..... 2.05c. to 2.15c.  
New York, del'd ..... 2.19c. to 2.25c.  
On cars dock Gulf ports ..... 2.45c.  
On cars dock Pacific ports ..... 2.60c.  
Wrought iron plates, P'tg ..... 3.80c.

\* Subject to concessions, particularly in the East, of \$2 a ton.

### FLOOR PLATES

Pittsburgh or Chicago ..... 3.35c.  
New York, del'd ..... 3.71c.  
On cars dock Gulf ports ..... 3.70c.  
On cars dock Pacific ports ..... 3.95c.

### STRUCTURAL SHAPES

#### Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham ..... 2.10c.  
Philadelphia, del'd ..... 2.215c.  
New York, del'd ..... 2.27c.  
On cars dock Gulf ports ..... 2.45c.  
On cars dock Pacific ports ..... 2.70c.

### STEEL SHEET PILING

#### Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.  
On cars dock Gulf ports ..... 2.58c.  
On cars dock Pacific ports ..... 2.90c.

### RAILS AND TRACK SUPPLIES

#### F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton ..... \$40.00  
Angle bars, per 100 lb. ..... 2.70

#### F.o.b. Basing Points

Light rails (from billets) per gross ton ..... \$40.00  
Light rails (from rail steel) per gross ton ..... 39.00

#### Base per Lb.

Cut spikes ..... 3.00c.  
Screw spikes ..... 4.55c.  
Tie plates, steel ..... 2.15c.  
Tie plates, Pacific Coast ports ..... 2.25c.  
Track bolts, to steam railroads 4.15c.  
Track bolts to jobbers, all sizes (per 100 counts) ..... 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

### SHEETS

#### Hot Rolled

#### Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago ..... 2.00c.  
Detroit, delivered ..... 2.10c.  
Philadelphia, delivered ..... 2.17c.  
Granite City ..... 2.10c.  
On cars dock Pacific ports ..... 2.50c.  
Wrought iron, Pittsburgh ..... 4.10c.

#### Cold Rolled\*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago ..... 3.05c.  
Detroit, delivered ..... 3.15c.  
Granite City ..... 3.15c.  
Philadelphia, delivered ..... 3.37c.  
On cars dock Pacific ports ..... 3.65c.

\* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

#### Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham ..... 3.50c.  
Philadelphia, del'd ..... 3.67c.  
Granite City ..... 3.60c.  
On cars dock Pacific ports ..... 4.00c.  
Wrought iron, Pittsburgh ..... 6.10c.

### Electrical Sheets

#### (F.o.b. Pittsburgh)

#### Base per Lb.

Field grade ..... 3.20c.  
Armature ..... 3.55c.  
Electrical ..... 4.05c.  
Motor ..... 4.95c.  
Dynamo ..... 5.65c.  
Transformer 72 ..... 6.15c.  
Transformer 65 ..... 7.15c.  
Transformer 58 ..... 7.55c.  
Transformer 52 ..... 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

#### Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary ..... 3.80c.  
F.o.b. cars dock Pacific ports. 4.50c.

Vitreous Enameling Stock, 20 Gage\*  
Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland ..... 3.35c.  
Detroit, del'd ..... 3.45c.  
Granite City ..... 3.45c.  
On cars dock Pacific ports ..... 3.95c.

### TIN MILL PRODUCTS

#### \*Tin Plate

#### Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary ..... \$5.00  
Standard cokes, Granite City ..... 5.10

\* Prices effective Nov. 10 on shipments through first quarter of 1939.

#### Special Coated Manufacturing Ternes

#### Per Base Box

Granite City ..... \$4.40  
Pittsburgh or Gary ..... 4.30

#### Roofing Terne Plate

#### (F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)  
8-lb. coating I.C. ..... \$12.00  
15-lb. coating I.C. ..... 14.00  
20-lb. coating I.C. ..... 15.00  
25-lb. coating I.C. ..... 16.00  
30-lb. coating I.C. ..... 17.25  
40-lb. coating I.C. ..... 19.50

Black Plate, 29 gage and lighter  
Pittsburgh, Chicago and Gary 3.05c.  
Granite City ..... 3.15c.  
On cars dock Pacific ports, boxed ..... 4.00c.

### HOT ROLLED STRIP

#### (Widths up to 12 in.)

#### Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.00c.  
Detroit, delivered ..... 2.10c.

#### Cooperage Stock

#### Pittsburgh & Chicago ..... 2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

### COLD ROLLED STRIP\*

#### Base per Lb.

Pittsburgh, Youngstown or Cleveland ..... 2.80c.  
Chicago ..... 2.90c.  
Detroit, delivered ..... 2.90c.  
Worcester ..... 3.00c.

#### \* Carbon 0.25 and less.

#### Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland ..... 2.95c.  
Detroit, delivered ..... 3.05c.  
Worcester ..... 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

### COLD ROLLED SPRING STEEL

#### Pittsburgh and

#### Cleveland Worcester

Carbon 0.26-0.50% ..... 2.80c. 3.00c.  
Carbon 0.51-0.75% ..... 4.30c. 4.50c.  
Carbon 0.76-1.00% ..... 6.15c. 6.35c.  
Carbon 1.01-1.25% ..... 8.35c. 8.55c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

### To Manufacturing Trade

Per Lb.

Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

\* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

### To the Trade

Base per Keg

Standard wire nails	\$2.40
Coated nails	2.40
Cut nails, carloads	3.60

Base per 100 Lb.

Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Polished staples	3.10
Galvanized staples	3.35
Twisted barbless wire	3.25
Woven wire fence, base column	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	\$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool	\$2.76

Note: Birmingham base same on above items, except spring wire.

## STEEL AND WROUGHT IRON PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

### Butt Weld

Steel	Wrought Iron	Steel	Wrought Iron
In. Black Galv.	In. Black Galv.	In. Black Galv.	In. Black Galv.
56	36	4% & %	+9 +30
1/4 to 59	43 1/2	1/2	24 61/2
63 1/2	54	3/4	30 13
66 1/2	60 1/2	1 & 1/4	34 19
1 to 3	68 1/2	1 1/2	38 21 1/2
2	60	2	37 1/2 21

### Lap Weld

2	51 1/2	2	30 1/2 15
2 1/2 & 3	64	55 1/2	2 1/2 to 3 1/2 31 1/2 17 1/2
3 1/2 to 6.66	57 1/2	4	33 1/2 21
7 & 8.65	55 1/2	4 1/2 to 8.32 1/2	20
9 & 10.64 1/2	55	9 to 12.28 1/2	15
11 & 12.63 1/2	54		

Butt weld, extra strong, plain ends	1/4 to 54 1/2	1/4 & %	+10 +43
1/2 to % 56 1/2	45 1/2	1/2	25 9
1/2	61 1/2	37 1/2	31 15
3/4	65 1/2	57 1/2	1 to 3 38 22 1/2
1 to 3	67 60		

Lap weld, extra strong, plain ends	59	51 1/2	2	33 1/2 18 1/2
2	59	51 1/2	2	33 1/2 18 1/2
2 1/2 & 3	63	55 1/2	2 1/2 to 3 1/2 25 1/2	
3 1/2 to 6.66	57 1/2	4	33 1/2 21	
7 & 8.65	55 1/2	4 1/2 to 8.32 1/2	20	
9 & 10.64 1/2	55	7 & 8.38 1/2	24 1/2	
11 & 12.63 1/2	54	9 to 12.28 1/2	15	

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

### Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless		Lap Weld
	Cold	Hot	Hot
1 in. o.d....13 B.W.G.	\$ 9.01	\$ 7.82	....
1 1/2 in. o.d....13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d....13 B.W.G.	11.70	10.23	\$9.72
1 1/2 in. o.d....13 B.W.G.	13.42	11.64	11.06
1 1/2 in. o.d....13 B.W.G.	15.03	13.04	12.38
2 1/2 in. o.d....13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d....13 B.W.G.	18.45	16.01	15.16
2 1/2 in. o.d....12 B.W.G.	20.21	17.54	16.58
2 1/2 in. o.d....12 B.W.G.	21.42	18.59	17.54
2 1/2 in. o.d....12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d....12 B.W.G.	25.37	24.62	22.65
4 1/2 in. o.d....10 B.W.G.	32.20	30.54	24.66
4 1/2 in. o.d....10 B.W.G.	43.04	37.35	35.22
5 in. o.d....9 B.W.G.	54.01	46.87	44.25
6 in. o.d....7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

10,000 lb. or ft. over	Base
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

## CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$51.00
6-in. and larger, del'd New York	49.00
6-in. and larger, Birmingham	43.00
Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, \$3 extra 4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$42, Birmingham, and \$5 delivered Chicago and 4-in. pipe, \$45, Birmingham, and \$54 delivered Chicago.

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. and 6 in. and smaller	68 1/2
Larger and longer up to 1 in.	66
1 1/2 in. and larger	64
Lag bolts	66

Plow bolts, Nos. 1, 2, 3, and 7

68 1/2

Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:

67

9/16 in. to 1 in. inclusive

64

1 1/4 in. and larger

62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin, hexagon nuts U.S.S. S.A.E. 1/2 in. and smaller

67

70

9/16 to 1 in.

64

65

1 1/2 in. and larger

62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached

72 1/2

Stove bolts in packages, with nuts separate

72 1/2 and 12 1/2

Stove bolts in bulk

84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets (1/2 in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

\$3.40

Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

.65 and 10

### Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller

50 and 10

Milled headless set screws, cut thread 1/2 in. and smaller

70

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

67 1/2

Upset set screws, cup and oval points

75

Milled studs

60

## Alloy Steel

### Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$56.00 a gross ton.

### Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base

2.70c.

Delivered, Detroit

2.80c.

S.A.E.

Alloy

Series

Differential

Numbers

per 100 Lb.

200 (1 1/2% Nickel)

\$0.35

2100 (1 1/2% Nickel) \$0.75

2300 (3 1/2% Nickel) 1.55

2500 (5% Nickel) 2.25

3100 Nickel-chromium 0.70

3200 Nickel-chromium 1.85

3300 Nickel-chromium 3.30

3400 Nickel-chromium 3.20

4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) 0.55

4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) 0.75

4340 Chr.-Ni.-Mo. 1.65

4345 Chr.-Ni.-Mo. 1.55

4600 Nickel molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.) 1.10

5100 Chrome steel (0.60-0.90 Cr.) 0.35

5100 Chrome steel (0.80-1.10 Cr.) 0.45

6100 Chromium spring steel 0.15

6100 Chromium-vanadium bar 1.20

6100 Chromium-vanadium spring steel 0.85

Chromium-nickel vanadium 1.50

Carbon-vanadium 0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

### Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c. carlots

## STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

### Chrome-Nickel

## RAW MATERIALS PRICES

### PIG IRON

#### No. 2 Foundry

F.o.b. Everett, Mass.	\$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham	17.38

\* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

#### Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

#### Basic

F.o.b. Everett, Mass.	\$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

#### Bessemer

F.o.b. Buffalo	\$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. .... \$26.50

#### Gray Forge

Valley or Pittsburgh furnace... \$20.50

#### Charcoal

Lake Superior furnace .... \$25.00  
Delivered Chicago .... 28.34

#### Canadian Pig Iron

##### Per Gross Ton

Montreal	
Foundry iron	\$24.50 base
Malleable	25.00 base
Basic	24.50 base

#### Toronto

Foundry iron	\$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

### FERROALLOYS

#### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

##### Per Gross Ton

Domestic, 80% (carload) .... \$80.00

#### Spiegeleisen

##### Per Gross Ton Furnace

Domestic, 19 to 21% .... \$28.00

Domestic, 26 to 28% .... 33.00

#### Electric Ferrosilicon

##### Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk) .... \$69.50\*

50% (ton lots in 50 gal. bbl.) .... 80.50\*

75% (carload lots, bulk) .... 126.00\*

75% (ton lots in 50 gal. bbl.) .... 139.00\*

#### Bessemer Ferrosilicon

##### F.o.b. Furnace, Jackson, Ohio

##### Per Gross Ton

10.00 to 10.50% .... \$30.50

For each additional 0.50% silicon up to 12%.

50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

#### Silvery Iron

##### Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% .... \$24.50

For each additional 0.5% silicon up to 12%.

50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

#### Ferrochrome

##### Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon .... 10.50c.\*

2% carbon .... 16.50c.\*

1% carbon .... 17.50c.\*

0.10% carbon .... 19.50c.\*

0.06% carbon .... 20.00c.\*

#### Silico-Manganese

##### Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon .... \$83.00

2.50% carbon .... 88.00

2% carbon .... 93.00

1% carbon .... 103.00

#### Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads.... \$1.75

Ferrotungsten, 100 lbs. and less 2.00

Ferrovanadium, contract, per lb. contained V, delivered

.... \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†

Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract

per net ton .... \$142.50

Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton .... \$157.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton .... \$58.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville .... \$75.00

Ferromolybdenum, per lb. Mo. f.o.b. furnace .... 95c.

Calcium molybdate, per lb. Mo. f.o.b. furnace .... 80c.

Molybdenum oxide briquettes

48-52% Mo; per lb. contained Mo, f.o.b. Langloch, Pa. .... 80c.

\* Spot prices are \$5 per ton higher.

† Spot prices are 10c. per lb. of contained element higher.

### ORES

#### Lake Superior Ores

##### Delivered Lower Lake Ports

##### Per Gross Ton

Old range, Bessemer, 51.50% .... \$5.25

Old range, non-Bessemer, 51.50% .... 5.18

Messabi, Bessemer, 51.50% .... 5.10

Messabi, non-Bessemer, 51.50% .... 4.95

High phosphorus, 51.50% .... 4.85

#### Foreign Ore

##### C.i.f. Philadelphia or Baltimore

##### Per Unit

Iron, low phosph., copper free, 55 to 58% dry, Algeria .... 12c.

Iron, low phosph., Swedish, average, 68 1/2% iron .... 12c.

Iron, basic or foundry, Swedish, aver. 65% iron .... 10 1/2c.

Iron, basic or foundry, Russian, aver. 65% iron .... Nominal

Man., Caucasian, washed 52% .... 29c.

Man., African, Indian, 44-48% .... 25c.

Man., African, Indian, 49-51% .... 30c.

Man., Brazilian, 46 to 48% .... 27c.

#### Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered .... \$18.00

Tungsten, domestic, scheelite delivered .... \$16.00 to \$17.00

Chrome or (lump) c.i.f. Atlantic Seaboard, per gross

ton: South African (low grade) .... \$15.00

Rhodesian, 45% .... 19.00

Rhodesian, 48% .... 22.00

Turkish, 48-49% .... 22.50

Turkish, 45-56% .... 19.50

Turkish, 40-41% .... 17.00

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

50% .... \$24.00

48-49% .... 23.50

### FLUORSPAR

##### Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail .... \$16.00 to \$17.00

Domestic, f.o.b. Ohio River landing barges .... \$16.50 to 17.50

No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines. \$17.00 to 18.00

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid .... 21.50

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines.... 31.50

### FUEL OIL

##### Per Gal.

No. 2, f.o.b. Bayonne, N. J.... 3.875c.

No. 6, f.o.b. Bayonne, N. J.... 2.50c.

No. 5 Bur. Stds., del'd Chicago 3.25c.

No. 6 Bur. Stds., del'd Chicago 2.75c.

No. 3 distillate, del'd Cleve'd. 5.50c.

No. 4 industrial, del'd Cleve'd. 5.25c.

No. 5 industrial, del'd Cleve'd. 3.75c.

No. 6 industrial, del'd Cleve'd. 3.50c.

### COKE

##### Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt .... \$3.75

Furnace, f.o.b. Connells-ville, Prompt .... \$4.75 to 5.50

Foundry, by - product

Chicago ovens .... 10.25

Foundry, by - product, del'd New England.... 12.50

Foundry, by - product, del'd Newark or Jersey City .... 10.88 to 11.40

Foundry, by - product, Philadelphia .... 10.96

Foundry, by - product, delivered Cleveland .. 10.30

Foundry, by - product, delivered Cincinnati .. 9.75

Foundry, Birmingham.... 7.50

Foundry, by - product, del'd St. Louis industrial district .... 10.75 to 11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports .... 14.75

## IRON AND STEEL WAREHOUSE PRICES

### PITTSBURGH\*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structural, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.

On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.

All above prices for delivery within the Pittsburgh switching district.

### NEW YORK

	Base per Lb.
Plates, $\frac{1}{4}$ in. and heavier	3.75c.
Structural shapes	3.75c.
Soft steel bars, round	3.84c.
Iron bars, Swed. char-coal	7.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
Floor plate, $\frac{1}{4}$ in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.70c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in lots of five kegs or more	\$2.65

\*For lots less than 2000 lb.

### CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.25c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

### CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Reinfor. bars (under 2000 lb.)	2.55c.
Cold-fin. bars (1000 lb. over)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.35c.
Floor plates, $\frac{1}{16}$ in. and heavier	5.18c.
*Black ann'l'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
Common wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

\* For 5000 lb. or less.

† 500 lb. base quantity.

Prices shown on hot rolled bars, strip, sheets, and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

### ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.53c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.58c.
Structural rivets	5.02c.

\* No. 26 and lighter take special prices.

### BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, $\frac{1}{4}$ in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb., plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb., minus 20c.; 10,000 to 39,999 lb., minus 30c.; 40,000 lb. and over minus 40c.

### BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, $\frac{3}{16}$ x 14 in. to 48 in. wide incl. also sizes	
No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.82c.

### NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	

### REFRACTORIES PRICES

Fire Clay Brick	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	\$60.30
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.30
Ground fire clay, per ton	7.10

### Chrome Brick

#### Net per Ton

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

### Magnesite Brick

#### Net per Ton

Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

### Grain Magnesite

#### Net per Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

### PHILADELPHIA

	Base per Lb.
Plates, $\frac{1}{4}$ -in. and heavier	3.40c.
Structural shapes	3.40c.
Soft steel bars, small shapes, iron bars (except bands)	3.60c.
Reinforced steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.06c.
Steel hoops	4.10c.
Steel bands, No. 12 and 3/16 in. incl.	3.60c.
Spring steel	4.75c.
Hot-rolled annealed sheets	3.40c.
Galvanized sheets (No. 24)	4.28c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

\* For quantities between 400 and 1999 lb.

† For 10 bundles or over.

‡ For one to five tons.

### BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
or more	
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88c.
Cold finished bars	4.43c.
Machine and car-ribs	
bolts	50 & 10 off list
Rivets (structural)	\$4.60 base

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

### PACIFIC COAST

	Base per Lb.
San Francisco	3.45c.
Los Angeles	3.80c.
Seattle	3.95c.
Plates, tanks and U. M.	3.80c.
Shapes, standard	3.45c.
Soft steel bars	3.50c.
Reinforcing bars, f.o.b. cars dock	
Pacific ports	2.275c. open. 2.975c.
Hot-rolled sheets (No. 10)	3.45c. 4.00c. 3.70c.
Galv. sheets (No. 24 and lighter)	5.15c. 4.75c. 5.00c.
Galv. sheets (No. 22 and heavier)	5.40c. 4.75c. 5.00c.
Cold-finished steel	
Rounds	6.55c. 6.60c. 7.10c.
Squares and hexagons	7.80c. 7.85c. 7.10c.
Flats	8.30c. 8.35c. 8.10c.
Common wire nails—base per keg less carload	\$3.00 \$3.05 \$3.00

All items subject to differentials for quantity.

### ST. PAUL

	Base per Lb.


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# FABRICATED STEEL

## NORTH ATLANTIC STATES AWARDS

10,200 Tons, Woodbridge - Sayreville, N. J., Raritan River bridge, to Bethlehem Steel Co., Bethlehem, Pa.

1200 Tons, Bedford County, Pa., highway bridges, section 12A, for Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa.

850 Tons, New York, Queens-Midtown Tunnel, contract 12A, to Bethlehem Steel Co., Bethlehem, Pa.

480 Tons, Erie, Pa., Powell Avenue viaduct, to American Bridge Co., Pittsburgh.

300 Tons, Brooklyn, Shore Parkway at Crosby Avenue, MS-39-7, to American Bridge Co.

300 Tons, Perth Amboy, N. J., three buildings, American Smelting & Refining Co., to Belmont Iron Works, Philadelphia.

260 Tons, Titusville, Pa., South Franklin Street bridge, to Lackawanna Steel Construction Corp., Buffalo.

250 Tons, Sabattis, N. Y., State highway bridge RC-4017, to American Bridge Co., Pittsburgh.

235 Tons, Queens, N. Y., Southern Parkway bridge SSO-39-2, to Bethlehem Steel Co., Bethlehem, Pa.

220 Tons, Bloomfield, N. J., St. Thomas Apostolic Church, to Selbach-Meyer Co., West New York, N. Y.

210 Tons, Queens, N. Y., reconstruction State bridge SG-113, to Bethlehem Steel Co., Bethlehem, Pa.

185 Tons, Chevy Chase, Md., telephone building additions, to Barber & Ross, Washington.

180 Tons, Vassalboro, Me., Seven Mile Brook bridge, to American Bridge Co., Pittsburgh.

175 Tons, Staten Island, N. Y., Staten Island Railway grade elimination, to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Harrison, N. J., factory building, National Oil Products Co., to Lehigh Structural Steel Co., Allentown, Pa.

135 Tons, Central Islip, N. Y., State hospital buildings, to Belmont Iron Works, Philadelphia.

135 Tons, Coxsackie, N. Y., school, garage, etc., to Bethlehem Steel Co., Bethlehem, Pa.

130 Tons, Forest Hills, N. Y., Ridgewood Savings Bank building, to American Bridge Co., Pittsburgh.

120 Tons, Frostburg, Md., high school, to Griffith-Custer Steel Co., Johnstown, Pa.

## THE SOUTH

460 Tons, Riverton, Va., bridge repairs, to Virginia Bridge Co., Roanoke, Va.

235 Tons, Asheboro, N. C., bridge, to Carolina Steel & Iron Co., Greensboro, N. C.

220 Tons, Franklin, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

200 Tons, Richmond, Va., warehouse, to Richmond Structural Steel Co., Richmond, Va.

180 Tons, Hope Mills, N. C., bridge, to Carolina Steel & Iron Co., Greensboro, N. C.

110 Tons, Culpeper, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

105 Tons, Shadwell, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

## CENTRAL STATES

4200 Tons, Chicago, vocational school, to Duffin Iron Works, Chicago.

1200 Tons, Detroit, store and tire service station, Montgomery Ward & Co., to Whitehead & Kales, Detroit.

500 Tons, Chicago, synchronous condenser house, Commonwealth Edison Co., to Bethlehem Steel Co., Bethlehem, Pa.

335 Tons, Urbana, Ill., Illinois Union building, University of Illinois, to Duffin Iron Co., Chicago.

265 Tons, Muscatine, Iowa, power house, to Clinton Bridge Works, Clinton, Iowa.

210 Tons, Quincy, Ill., pattern storage and pattern shop, Gardner-Denver Co., to an unnamed fabricator.

175 Tons, Rochester, Minn., 100 First Avenue building, to St. Paul Foundry Co., St. Paul, Minn.

175 Tons, Chicago, uptown post office building, to Wendnagel & Co., Chicago.

160 Tons, Cleveland, hospital building, to Fort Pitt Bridge Works Co., Pittsburgh.

140 Tons, Woodstock, Ill., Community High School building, to A. F. Anderson Iron Works Co., Chicago.

130 Tons, Chicago, Illinois Central System, St. Charles Air Line bridge repairs, to Vierling Steel Works, Chicago.

115 Tons, Martinsville, Ind., State bridge, to Bethlehem Steel Co., Bethlehem, Pa.

## WESTERN STATES

300 Tons, San Francisco, turntables, Southern Pacific Co., to Hansell-Ecock Co., Chicago.

**PENDING STRUCTURAL PROJECTS**

**NORTH ATLANTIC STATES**

3300 Tons, Pittsburgh, contract No. 6, Water Street improvement.

2500 Tons, New Ellenville, N. Y., Lackawack Dam; Mason & Hanger Construction Co., New York, low bidder (previously reported).

2400 Tons, Brooklyn, Midwood High School.

725 Tons, New York, grade separation bridge, contract MS-39-8.

600 Tons, New York, apartment houses, Riverdale Park, Inc.

570 Tons, Cumberland County, Pa., bridges on turnpike section 19-20-E; John S. Swanger, Lancaster, general contractor (previously reported).

400 Tons, Waukesha, N. Y., guides, guide supports, etc.

385 Tons, Columbia County, N. Y., including 78 tons reinforcing steel, grade separation, highway project F.A.G.H. 8532; bids close Aug. 16.

342 Tons, Dutchess County, including 42 tons reinforcing steel, two bridges, highway projects SS 39-13 and 39-12; bids close Aug. 16.

300 Tons, Lewisburg, Pa., building for penitentiary; bids in (previously reported).

240 Tons, Bedford County, Pa., bridges on turnpike section 14-A; L. M. Hutchinson, Mount Union, Pa., general contractor (previously reported).

150 Tons, Brooklyn, grade separation bridge, contract MS-39-5.

115 Tons, Pittsburgh, store building, S. S. Kresge Co.

## THE SOUTH

850 Tons, Louisville, Ky., Seventh Street bridge; Henry Bieckel Co., general contractor (previously reported).

600 Tons, Labecos, S. C., renewal of Huspahr Creek bridge, Seaboard Air Line.

373 Tons, Orange, Tex., bridge.

105 Tons, Gilbertville, Ky., unloading trestle for Kentucky Dam, T.V.A.

**CENTRAL STATES**

375 Tons, Detroit, driveway building, Lincoln factory, Ford Motor Co.

275 Tons, Cincinnati, International Harvester building.

235 Tons, Decatur, Ill., grain storage tanks, A. E. Staley Mfg. Co.

230 Tons, Chicago, addition to Isham Y. M. C. A.

195 Tons, Cincinnati, Grand Theater and store building, for Mrs. Ingalls and Mrs. Semple.

130 Tons, Chicago, remodeling warehouse for service building No. 1, for Atchison, Topeka & Santa Fe Railway Co.

## WESTERN STATES

900 Tons, Sacramento, Cal. telephone building.

175 Tons, Franktown, Colo., State bridge FAS-30-B (1).

115 Tons, Leadville, Colo., State bridge FAGH-182-B (1).

100 Tons, Leadville, Colo., overcrossing; bids Aug. 3.

## FABRICATED PLATES

**AWARDS**

2800 Tons, Toledo, 10,200 ft. 72-in. pipe for water project, to Biggs Boiler Works, Akron, Ohio.

500 Tons, Pollock, Cal., tunnel supports for railroad relocation around Shasta Dam, to Western Pipe & Steel Co., San Francisco; through R. G. Clifford, San Francisco, contractor.

400 Tons, Gary, Ind., sewer pipe, to Taylor Forge & Pipe Works, Chicago.

300 Tons, San Francisco, oil tanks, to Western Pipe & Steel Co., San Francisco.

130 Tons, Lapine, Ore., outlet pipe for Bureau of Reclamation, to John Mohr, Chicago.

## Pending Projects

Unstated tonnage, Mono County, Cal., 12,706 ft. of 103-in. pipe for Los Angeles Department of Water and Power conduit (Specification 2952, Alternate D); bids Aug. 10.

## SHEET PILING

**AWARDS**

270 Tons, Fairport, Ohio (used piling), dock for Diamond Alkali, to L. B. Foster, Pittsburgh.

## Scrap Consumption Increases in June

DOMESTIC consumption of scrap iron and steel in June is estimated by the Institute of Scrap Iron and Steel, Inc., New York, at 2,428,000 tons, compared with 2,263,000 in May, and 1,257,000 in June, 1938.

For the first half of 1939 domestic consumption approximated 14,430,000 tons, according to the institute, an increase of 73.8 per cent over the 8,302,000 tons in the first half of 1938. Approximately one-half of scrap consumed is purchased on open market scrap, and one-half is "home" scrap.

Meanwhile, June exports of 398,888 tons of scrap brought the total of exports for the first half of 1939 up to 1,788,952 tons, as compiled by the Department of Commerce. This was fractionally under the 1,798,147 tons exported in the first half of 1938.

## June Ore Shipments Highest Since 1937

CLEVELAND — Shipments of Lake Superior iron ore from upper lake ports in July were 6,309,938 gross tons, a gain of 93 per cent over the 3,267,813-ton total of July, 1938, and the highest monthly figure since October, 1937, according to the Lake Superior Iron Ore Association. Shipments in June were 5,572,998 tons.

The cumulative total of shipments for the current season to Aug. 1, is 15,541,187 tons as compared with 7,994,412 tons in comparable period of 1938, a gain of close to 106 per cent.

## Kill New Deal Alibi Now, R. A. Weaver Tells Business

INDUSTRY does not dare develop the theory that vast unemployment is with us permanently, R. A. Weaver, president of Ferro Enamel Corp., Cleveland, said this week in his publication, "The Enamelist."

The Government is going to claim in 1940 (election year) that business has not put people back to work and that Government will have to solve the problem by much greater spending, Mr. Weaver said. "If business takes on this task, I'm sure they will succeed," he said. "If they fail they can fairly place the blame for failure on the Government or perhaps on the union leaders, if these agencies do not cooperate."

# NON-FERROUS...

...Copper firm at 10.375c., but business is slack... Spelter consumers well covered, and current 4.60c. market is quiet... Lead up \$2 a ton to 4.95c. with inquiry brisk... Tin continues lethargic.

NEW YORK, Aug. 1—Quotations on the red metal are now quite firm at the 10.375c. a lb., delivered Connecticut Valley, figure, and market undertone is decidedly on the stronger side, what with July producer stocks showing a sharp decrease and the foreign market continuing an active pace. One producer selling at a lower figure moved up to 10.375c. this morning, and the market is generally at this higher figure now, although the active demands of the past

week have not carried over into the higher price range. In Europe the demand for copper continues active, and prices there this morning ranged from 10.425c. to 10.45c. per lb., c.i.f. European base ports. Producers' sales of electrolytic metal for July totaled 180,549 tons, surpassing the June total by a few hundred tons. For the first six months of this year 161,000 tons of ingots and bars was exported, with Japan being the largest single buyer.

## NON-FERROUS PRICES

### Cents per lb. for early delivery

	July 26	July 27	July 28	July 29	July 31	Aug. 1
Copper, Electrolytic <sup>1</sup>	10.31	10.31	10.31	10.31	10.375	
Copper, Lake	10.375	10.375	10.375	10.375	10.375	10.375
Tin, Straits, New York	48.40	48.45	48.45	48.45	48.45	48.45
Zinc, East St. Louis <sup>2</sup>	4.60	4.60	4.60	4.60	4.60	4.60
Lead, St. Louis <sup>3</sup>	4.70	4.70	4.70	4.70	4.80	4.80

<sup>1</sup> Delivered Conn. Valley. Deduct 1/4c. for New York delivery. <sup>2</sup> Add 0.39c. for New York delivery. <sup>3</sup> Add 0.15c. for New York delivery.

### Warehouse Prices

#### Cents per lb., Delivered

New York Cleveland	
Tin, Straits pig	49.60c. 51.50c.
Copper, Lake	11.50c. 11.50c.
Copper, electro	11.375c. 11.50c.
Copper, Castings	11.00c. 11.25c.
Copper sheets, hot-rolled	18.37c. 18.37c.
High brass sheets	16.65c. 16.65c.
Seamless brass tubes	19.40c. 19.40c.
Seamless copper tubes	18.87c. 18.87c.
Brass rods	12.00c. 12.00c.
Zinc slabs	6.15c. 6.90c.
Zinc sheets, No. 9 casks	10.75c. 12.10c.
Lead, American pig	5.85c. 5.95c.
Lead, bar	6.45c. 8.25c.
Lead, sheets, cut	8.00c. 8.00c.
Antimony, Asiatic	15.00c. 17.00c.
Alum., virgin, 99 per cent plus	21.50c. 22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c. 19.50c.
Solder, 1/2 and 1/2	29.25c. 29.50c.
Babbitt metal, commercial grade	21.25c. 21.50c.

The new prices on copper alloy products had not been announced at time of going to press, but are expected shortly. They will apparently be proportioned on the basis of an 1/4c. rise in the price of the base metal.

\*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3;

on brass sheets and rods, 40, and on brass and copper tubes, 25.

### Old Metals

#### Cents per lb., New York

*Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.*

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.125c.	8.750c.
Copper, hvy. and wire	7.125c.	7.500c.
Copper, light and bottoms	6.250c.	6.625c.
Brass, heavy	4.25c.	4.75c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.250c.	7.125c.
No. 1 yel. brass turnings	4.00c.	4.50c.
No. 1 red brass or composition turnings	6.125c.	6.625c.
Lead, heavy	3.875c.	4.25c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.25c.	13.75c.
Zinc	2.125c.	3.375c.

### Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 12c. a lb. QUICKSILVER, \$88 to \$90 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.50c. a lb.

### Zinc

Consumers are well covered for three months forward on estimated requirements, and the market is expected to remain quiet at the 4.60c., East St. Louis, figure for some time unless European prices move upward and drive in more forward coverage here. Last week prime Western sales totaled 9447 tons, of which 6461 tons was sold at 4.50c. a lb., 2486 tons at 4.60c., and 500 tons at the price ruling at time of shipment. Shipments for the week totaled 4796 tons, of which 200 tons was brass special; undelivered orders are quite high at 50,381 tons, of which 1800 tons is brass special.

### Lead

With consumer demands coming in at a brisk pace, lead was advanced yesterday \$2 a ton to 4.95c. a lb., New York. The volume of business at this new higher figure is considered quite satisfactory. August requirements are estimated as being about 70 per cent covered, and September has been touched in only a moderate way, perhaps in the neighborhood of 15 per cent. In view of the open situation in September, producers are looking forward to a continuing good demand. July shipments most likely will go well over 40,000 tons, and will probably represent the best month of the year, the previous high figure being 40,871 tons in March.

### Tin

The week's market for tin was merely a repetition of the stagnant condition ruling for the preceding two or three weeks. Consumers here are likely eating into stock piles but there is no tendency whatsoever to come into the present market for replacements, what with the buffer pool liquidating stocks at what is generally believed to be a maximum price level. Quite likely quietness will continue here for a little time yet, but no great reduction in the New York price is anticipated. Quotations in New York stayed at the 48.45c. figure virtually the entire week. On first call this morning London quotations were £229 17s. 6d. for prompt metal, £225 2s. 6d. for three months, and £230 7s. 6d. in the Far East.

### July Average Prices

The average prices of the major non-ferrous metals in July, based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	10.23c.
Lake copper, Eastern delivery	10.21c.
Straits tin, spot, New York	48.53c.
Zinc, East St. Louis	4.52c.
Zinc, New York	4.91c.
Lead, St. Louis	4.70c.
Lead, New York	4.85c.

# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**American Can Co.**, 230 Park Avenue, New York, has let general contract to Turner Construction Co., 420 Lexington Avenue, for one-story and basement addition, 150 x 225 ft., to branch plant at Jersey City, N. J. Cost close to \$100,000 with equipment. A. B. Heiser is company engineer, first noted address.

**Burland Printing Co.**, 53 Rose Street, New York, has leased eight-story building at 421 Hudson Street and will remodel for new plant. About \$250,000 will be expended for new equipment. Company will consolidate its five present plants at new location, including one at Albany, N. Y.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 8 for one motor-driven double-housing metal planer, and one hydraulic metal planer (Schedule 6843), 100,000 automatic fasteners (Schedule 6852) for Brooklyn Navy Yard.

**Federal Oil Co.**, 314 Second Street, Brooklyn, has taken over one-story building on about one and one-half-acre tract on Eleventh Avenue, Roselle, N. J., recently secured under lease, for new oil reclaiming plant.

**Western Electric Co.**, 195 Broadway, New York, telephone instruments and equipment, wire, etc., has let general contract to Beers Construction Co., 78 Ellis Street, N. E., Atlanta, Ga., for new three-story factory branch, storage and distributing plant, 112 x 210 ft., on Forest Road, N. E., Atlanta, with two-story service, repair and garage building adjoining. Cost close to \$500,000 with equipment. W. R. Kattelle, first noted address, is company engineer.

**Signal Corps Procurement District**, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Aug. 22 for couplings, control units, plugs, relays, indicators, etc. (Circular 2).

**Commanding Officer**, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 7 for one motor-driven grinder, cylindrical plain hydraulic grinder, two tool and cutter grinders (Circular 1); until Aug. 11, two saw cutoff machines (Circular 15).

**National Oil Products Co.**, Essex Street, Harrison, N. J., industrial chemicals, processed oil products, etc., has let general contract to Mahoney-Trost Construction Co., 657 Main Avenue, Passaic, N. J., for four-story and basement addition. Cost close to \$175,000 with equipment. Henry D. Scudder, Jr., 40 Clinton Street, Newark, is architect.

**Heyer Products Co., Inc.**, 740 Washington Avenue, Belleville, N. J., electric battery chargers, testers, parts, etc., plans new one-story plant on local site at Cortlandt and Little Streets. Cost close to \$50,000 with equipment.

**Commanding Officer**, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Aug. 7 for 200,000 fuze well cups (Circular 64); until Aug. 10, one automatic plating unit (Circular 27), two motor-driven horizontal universal precision milling machines (Circular 29), two wood-boring multiple machines and one glue jointer (Circular 26), two 3-in. and five 1½-in. motor-driven turret lathes (Circular 32); until Aug. 11, demolition bombs (Circular 1019); until Aug. 9, 194,000 die castings (Circular 83); until Aug. 14, 50,000 thumb nuts and 50,000 screw hooks (Circular 41), 25,000 galvanized steel wire rings (Circular 38).

**Superintendent of Lighthouses**, St. George, Staten Island, New York, asks bids until Aug. 7 for 300 acetylene cylinders, each 1060 cu. ft. capacity (Circular 60220).

**C. Schmidt & Sons, Inc.**, 127 Edwards Street, Philadelphia, brewer, has let general contract to A. Raymond Raff Co., 1635 Thompson Street, for two-story addition, 32 x 42

ft., to be equipped as a machine shop. Cost close to \$40,000 with equipment. H. A. Kuljian & Co., 1518 Walnut Street, are consulting engineers.

**London Dry Ginger Ale Co., Inc.**, Wilmington, Del., Dr. Fred F. Armstrong, 9 West Thirtieth Street, Wilmington, president, recently organized, has acquired property at Governor Printz Boulevard and Twenty-sixth Street, 100 x 180 ft., for new two-story mechanical-bottling, storage and distributing plant. Bids will be asked soon on general contract. Cost close to \$75,000 with equipment. J. Bancroft Peach, company engineer, is in charge. Russell T. Desjardins, 3307 Jefferson Street, is secretary of company.

**Commanding Officer**, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Aug. 8 for 20,000 cups and 20,000 valves (components for igniting primer) (Circular 49), two lighting panelboards and cabinets (Circular 50); until Aug. 15, 83 stethoscopic testers and 83 target assemblies (Circular 37).

## ◀ NEW ENGLAND ▶

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids until Aug. 23 for 25 overhead traveling bridge cranes for navy yards at Boston, Portsmouth, N. H., Philadelphia, Washington, and Mare Island (Specifications 9236).

**Hartford Rayon Corp.**, Rocky Hill, Conn., plans new power plant to cost about \$125,000 with generating unit, boiler and auxiliary equipment. Also will build a one-story mill addition, to be equipped as a recovery unit for salt production. Cost about \$50,000 with equipment. Company has arranged for RFC loan of \$400,000 for expansion noted and general operations.

**School Committee**, Fitchburg, Mass., plans new two-story vocational school, to concentrate all activities of this kind in one structure. Cost over \$150,000 with equipment. Financing will be arranged through Federal aid. S. W. Haynes & Associates, 336 Main Street, are architects.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 8 for ventilating equipment, with motors, controllers and spare parts (Schedule 6834) for Boston, Charleston and Puget Sound Navy yards; until Aug. 11, motor-operated horns (Schedule 2869) for Boston, Norfolk, Charleston and Puget Sound yards; until Aug. 15, motor-driven tube expander (Schedule 6893) for Newport, R. I., naval station.

**E. J. York Coal Co.**, Dover, N. H., plans rebuilding coal storage and distributing plant recently destroyed by fire. Loss over \$100,000 with mechanical-handling equipment, loaders, etc.

## ◀ WASHINGTON DIST. ▶

**Civil Aeronautics Authority**, New Commerce Building, Washington, asks bids until Aug. 9 for 24 diesel engine-generator plants, 25-kva. capacity, with all equipment; one to 24 outdoor radiators, two to 12 diesel engine-generator plants (Circular 182).

**Rustless Iron & Steel Corp.**, 3400 East Chase Street, Baltimore, will ask bids soon on general contract for one-story addition, 200 x 750 ft. Cost over \$850,000 with equipment.

**General Purchasing Officer**, Panama Canal, Washington, asks bids until Aug. 7 for gate, globe, angle and check valves, pipe straps, pipe hangers, brass or bronze unions, malleable iron unions, 3000 ft. of copper tubing and other equipment (Schedule 3521); until Aug. 8, portable electric power plant with gasoline-motor driven equipment, motor-driven power hacksaw, two ball-bearing utility drills, lead-coated copper annealed cable, etc. (Schedule 3527), 36,000 ft. of 1-in. diameter steel wire rope and 4000 ft. of rubber in-

sulated cable (Schedule 3530); until Aug. 9, rigid steel conduit, conduit locknuts, conduit bushings, 10,000 ft. of weather-resistant wire, 30 meter-testing blocks, magnet wire, etc. (Schedule 3532); until Aug. 10, two 30-ton diesel engine-driven locomotive cranes (Schedule 3534); until Aug. 11, 30-ton overhead electric traveling crane (Schedule 3533).

**Becker Pretzel Bakeries, Inc.**, 2500 West Booth Street, Baltimore, has asked bids on general contract for two-story and basement addition, 60 x 135 ft., to storage and distributing plant. Cost close to \$50,000 with equipment. Edward L. Ward, 1508 Bolton Street, is architect.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids until Aug. 9 for sea tide bridge for loading railroad cars on barges at naval magazine, Bellevue, Washington (Specifications 9224).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 8 for following tools for Alexandria, Va., yard: 20-in. horizontal ram shaper and fixtures (Schedule 6846), two drill grinders (Schedule 6850), two milling machines (Schedule 6851), two precision lathes (Schedule 6855), engine lathe (Schedule 6858), two wire feed screw machines (Schedule 6857), honing and lapping machine (Schedule 6853), hob, reamer and cutter grinder (Schedule 6862), two hand turret lathes and equipment (Schedule 6863), all motor-driven.

## ◀ SOUTH ATLANTIC ▶

**Southern Wire & Iron Works, Inc.**, 127 Fair Street, S. E., Atlanta, Ga., iron and steel specialties, wire goods, etc., has asked bids on general contract for one-story plant unit, 125 x 160 ft., with office building adjoining. Cost over \$60,000 with equipment. James C. Wise, Spring Street Building, is architect.

**Florida Sugar Distributors, Inc.**, 82 N. E. Sixth Street, Miami, Fla., plans one-story storage and distributing plant, 120 x 245 ft. Cost over \$50,000 with mechanical-handling, loading and other machinery. H. George Fink, 2138 Ponce de Leon Boulevard, Coral Gables, Fla., is architect; Jorgensen & Schreffer, News Tower Building, Miami, are engineers.

**Boyer Brothers**, Weirsdale, Fla., have let general contract to E. G. Gardner, Ocala, Fla., for one-story fruit packing plant at Weirsdale, 90 x 140 ft., with daily capacity of four cars. Cost over \$40,000 with mechanical-handling and other equipment.

## ◀ BUFFALO DIST. ▶

**Air-Cooled Motors Corp.**, Liverpool Road, Syracuse, N. Y., gasoline engines, parts, etc., plans one-story addition. Cost close to \$50,000 with equipment.

**General Motors Corp.**, 391 Lyell Avenue, Rochester, N. Y., has organized a new production unit under name of Rochester Products Division, to occupy new plant, recently completed, for manufacture of a line of automobile equipment, including speedometers, starters, generators, electric horns, fuel pumps, etc. New division will be operated in conjunction with Delco Appliance Division, which will continue at local plant for production of lighting plants, oil burners, coal stokers and kindred specialties. Thomas L. Lee will be manager at new plant.

**Berwin Paper Corp.**, Dansville, N. Y., manufacturer of white and colored paper stocks, has approved plans for one-story addition, 41 x 115 ft. Cost over \$50,000 with equipment.

## ◀ WESTERN PA. DIST. ▶

**Pittsburgh Plate Glass Co.**, Grant Building, Pittsburgh, has let general contract to Pioneer Construction Co., 619 Staples Street, Corpus Christi, Tex., for one-story factory branch, storage and distributing plant for glass, paint and oil divisions at Corpus Christi. Cost close to \$60,000 with equipment.

**Construction Service, Veterans' Administration**, Washington, asks bids until Aug. 22 for boiler unit and accessories, and boiler plant equipment for power house at Pittsburgh institution.

## ◀ SOUTH CENTRAL ▶

**United States Engineer Office**, Vicksburg, Miss., asks bids until Aug. 7 for boiler tubes, 4 in. o.d., 11 ft. 7½ in. long (Circular 12); one wood-working machine (Circular 13).

**Ingalls Shipbuilding Corp.**, Pascagoula, Miss., affiliated with Ingalls Iron Works Co., Birmingham, plans three new landing ways with equipment at local shipyard, and also plans other expansion.

**City Council**, Morgan City, La., plans expansion and improvements in municipal electric power plant and waterworks station, including additional equipment. Cost about \$10,000. Bond issue has been approved. Joseph Evans is city engineer in charge.

**Board of Aldermen**, Pineville, La., asks bids until Aug. 15 for motor-driven pumping machinery and auxiliary equipment for municipal water system.

**Director of Purchases**, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Aug. 7 for oil engine-powered crawler-type tractors, bulldozers, power units and other equipment for power dam at Guntersville, Ala.

## ◀ MICHIGAN DISTRICT ▶

**Keeler Brass Co.**, Webb Street, Grand Rapids, Mich., automobile and furniture hardware, brass castings, etc., has let general contract to Osterink Construction Co., Grand Rapids, for one-story addition. Cost close to \$45,000 with equipment. Robinson, Campau & Crowe, Grand Rapids, are architects.

**Producers Refining, Inc.**, West Branch, Mich., recently reorganized, plans expansion and improvements in oil refinery, including new unit for asphalt refining. Cost over \$50,000 with equipment. James P. Dunnigan is president and general manager.

**Fisher-Graff Iron & Metal Co.**, Kalamazoo, Mich., plans one-story and basement addition, 50 x 160 ft., for storage and distribution. Cost about \$50,000 with equipment.

## ◀ OHIO AND INDIANA ▶

**Thompson Grinder Co.**, West Main Street, Springfield, Ohio, surface grinders, special machinery and parts, has let general contract to C. B. Farish, Springfield, for one-story addition. Cost close to \$45,000 with equipment. Lloyd Zeller, Columbia Building, is architect.

**Robert and Charles Windecker**, Painesville, Ohio, have acquired about 65-acre tract near city limits for new plant for production of industrial chemicals, to comprise several one-story units, power house, machine shop and other mechanical departments. Cost close to \$75,000 with machinery. Company will be organized to carry out project.

**East Dayton Tool & Die Co.**, 310 East Second Street, Dayton, Ohio, has asked bids on general contract for one and two-story and basement addition, 80 x 125 ft., in McCook Field district, including boiler house. Cost about \$65,000 with equipment. Walter J. Thesis, Mutual Home Building, is architect.

**Contracting Officer**, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 7 for fixture assemblies, end wrenches, plate holders, reamers, screw drivers, lock clips, wrenches, telescoping wrenches, brackets, clamps, nipples, economizers and other equipment (Circular 24); until Aug. 8, boring bars from 7/32-in. diameter and 6 in. long to 1 in. diameter and 12½ in. long (Circular 27); until Aug. 9, machinist's tool chests and tool kits (Circular 28); until Aug. 10, 5500 steel plate nuts (Circular 23), welding acetylene cylinder regulators, welding oxygen line regulators, brazing torches with tips, cutting torches with tips (Circular 22); until Aug. 11, brass hammers and copper hammers (Circular 26), surface gages, telescope gages, thickness gages, steel rules, calipers, etc. (Circular 33).

**Graver Tank & Mfg. Co.**, East Chicago, Ind., plans rebuilding part of one-story assembling works recently destroyed by fire. Loss close to \$50,000 with equipment.

**United States Gypsum Co.**, 300 West Adams Street, Chicago, building products, plans rebuilding part of branch mill at South Bend,

Ind., operated in name of Henry-Millhouse manufacturing division, recently destroyed by fire. Loss about \$55,000 with equipment.

## ◀ SOUTHWEST ▶

**Shell Oil Co., Inc.**, Shell Building, St. Louis, and Atlantic Refining Co., 260 South Broad Street, Philadelphia, have approved plans for new jointly-owned natural gasoline extraction plant in Magnolia gas field area, Columbia County, Ark., where tract has been acquired. Plant will include compressor station, power house, pumping plant and other mechanical units, with steel tank storage and distribution facilities. Company will build loading racks and distribution facilities at Magnolia, near gas field district. Construction will be carried out by Shell company. Cost over \$300,000 with equipment. Last noted company has work under way on a similar gasoline extraction plant in Wesson gas field area, Tex.

**United States Engineer Office**, Missouri River Division, Davidson Building, Kansas City, Mo., asks bids until Aug. 16 for one 50,000-hp. and one 20,000-hp. hydraulic turbines, each with scroll case, draft tube liner, pit liner, etc., also two governors and accessories, for Fort Peck, Mont., hydroelectric power project (Circular 1).

**Midwest Piping & Supply Co., Inc.**, 1450 South Second Street, St. Louis, pipe coils and bends, flanges and joints, fittings, etc., has let general contract to Fruin-Colon Contracting Co., Merchants' Laclede Building, for one-story addition, 40 x 273 ft. Cost close to \$70,000 with equipment. W. J. Knight & Co., Wainwright Building, are consulting engineers.

**Condor Petroleum Co.**, Abilene, Tex., plans new natural gasoline and recycling plant in Grueland gas field district, Houston County, Tex., consisting of several large production units, with compressor station, power house, pumping station and other structures. Steel tank storage facilities will be installed. Cost close to \$250,000 with equipment.

**Port Compress & Bonded Warehouse Co.**, Brownsville, Tex., has approved plans for one-story storage and distributing building, 100 x 300 ft., at turning basin on water front. Cost about \$45,000 with mechanical-handling and loading equipment.

## ◀ MIDDLE WEST ▶

**Western-Austin Co.**, Farnsworth Avenue, Aurora, Ill., manufacturer of road machinery and other heavy equipment, has let general contract to James Stewart Corp., 343 South Dearborn Street, Chicago, for two additions, consisting of a one-story unit, 120 x 520 ft., for assembling department, and one-story, 150 x 251 ft., for raw material storage and distribution. Equipment installation will include electric cranes and other mechanical-handling facilities. Cost about \$275,000 with machinery. E. O. Sessions & Co., 120 South LaSalle Street, Chicago, are consulting engineers.

**Rival Packing Co.**, 371 South Halsted Street, Chicago, food packer, has let general contract to E. W. Sproul Co., 2001 West Pershing Road, for three-story and basement plant, 118 x 175 ft., at Forty-fifth Street and Tripp Avenue, where site was acquired recently. Cost close to \$350,000 with equipment. A. Epstein, 2001 West Pershing Road, is consulting engineer.

**Construction Service**, Veterans' Administration, Washington, asks bids until Aug. 15 for addition to power house at Knoxville, Iowa, institution, including boiler, boiler plant equipment, stoker and accessories, ash and fly ash conveyor equipment, etc.

**Public Utilities Commission**, 817 Franklin Street, Manitowoc, Wis., asks bids until Aug. 24 for 10,000-kw. steam turbo-generator unit and accessories, condenser and auxiliary apparatus for municipal electric power plant.

**Perfect Oil Co.**, Ninth and Green Bay Streets, LaCrosse, Wis., an interest of Wadham's Oil Co., Milwaukee, plans new bulk oil storage and distributing plant on water front, consisting of several one-story buildings, six steel storage tanks, pumping station, motor truck service and garage building and other units. Cost over \$65,000 with equipment.

**Fort Dearborn Lithograph Co.**, 2846 North California Avenue, Chicago, has asked bids for two-story addition, 50 x 125 ft. Cost about \$45,000 with equipment. Edward H. Nordlie, 4825 North California Avenue, is architect.

**City Council**, New Hampton, Iowa, asks bids until Aug. 15 for addition to municipal electric power plant, including 750-kw. turbo-generator unit, 1500 sq. ft. surface condenser, circulating water pumps, boiler feed pumps, water-softening equipment, switchgear, etc. Ralph D. Thomas & Associates, Inc., 1200 Second Avenue South, Minneapolis, are consulting engineers.

## ◀ PACIFIC COAST ▶

**United Air Lines, Inc.**, 221 North La Salle Street, Chicago, is completing plans for new branch terminal at airport, Portland, including steel hangar, machine shops and other mechanical departments. Cost about \$150,000 with equipment.

**Constructing Quartermaster**, Sacramento Air Depot, Sacramento, Cal., asks bids until Aug. 8 for one traveling bridge crane in center aisle of local air corps engineering shop (Circular 6870-1).

**Pacific Gas Radiator Co.**, 7615 Roseberry Avenue, Huntington Park, Cal., has let general contract to Jackson Brothers-Le Sage, 547 South Fairfax Avenue, Los Angeles, for one-story addition, about 18,000 sq. ft. of floor space. Cost close to \$60,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, Huntington Park, is engineer.

**Carstens Packing Co.**, Tacoma, Wash., meat packer, has asked bids on general contract for multi-story addition. Cost about \$100,000 with equipment. Henschien, Everds & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Aug. 11 for motor-driven centrifugal pump for gasoline service (Schedule 6859) for Puget Sound yard; 13,500 ft. of steel wire rope towing hawsers (Schedule 6835); until Aug. 15, two paravane and stores cranes, machinery and parts (Schedule 6856), insulated electric cable (Schedule 6838), for Mare Island yard; until Aug. 18, spare parts for airplanes (Schedule 900-2703) for San Diego naval air station.

**American Fruit Growers, Inc.**, 1206 Maple Avenue, Los Angeles, plans new branch packing plant at Highland, Ark., consisting of two one-story units for packing house, and storage and distribution respectively, boiler plant, machine shop and auxiliary buildings. Cost about \$100,000 with mechanical-handling and other equipment.

**Helm's Bakeries, Inc.**, 8800 Venice Boulevard, Los Angeles, has asked bids for two one-story additions, 80 x 395 ft., for expansion in loading and distributing department, and 60 x 80 ft., for storage service. Cost over \$75,000 with equipment. Grant & Bruner, Ferguson Building, are architects and engineers.

## ◀ FOREIGN ▶

**Ibex Electrical Products, Ltd.**, Melbourne, Victoria, Australia, recently organized to manufacture electric fans, motors and allied electrical equipment and parts, is arranging for acquisition of one-story building at 431 Hoddle Street, Abbotsford, Melbourne, totaling about 35,000 sq. ft. of floor space, and will expand for new plant. Company has authorized a stock issue of about \$167,000, a considerable part of proceeds to be used for purpose noted. F. T. Powell is one of heads of company and engineer.

**Firestone Tire & Rubber Co.**, Akron, Ohio, has approved plans for new branch mill at Bombay, India, on which work will begin at once. Cost over \$650,000 with machinery.

**Champlain Brewery, Ltd.**, 164 Le la Coronne Street, Quebec, has let general contract to Magloure-Cauchon, Ltd., 311 LaSalle Street, for rebuilding part of three-story and basement plant recently destroyed by fire. Cost about \$150,000 with equipment.

# THIS WEEK'S MACHINE TOOL ACTIVITIES . . .

*... Sales being maintained or increased somewhat . . . Foreign demand still an important factor . . . English engine to be built in Detroit for the French . . . Rock Island Arsenal inquiries for 46 machines.*

## Demand Rises Slightly Cincinnati Makers Report

**C**INCINNATI—A few points rise in the machinery average demand in this area is indicated by reports for the past week. Practically all of the improvement is in lathes, milling machines and grinders. In these items, manufacturers report heavier bookings from both foreign and domestic sources, with export business still predominating at a rate of about 60 to 40. Included on current bookings were a number of multiple unit orders. Except for Government orders, the domestic demand for heavy tools is not large, the bulk of this business being still confined to export. Drilling machinery is still sluggish, but shapers and brakes continue in good demand.

Manufacturers of heavy tools indicate that deliveries are less extended and they are catching up with shipping instructions, but the light tools are becoming more extended. Factory operations are averaging about 60 to 65 per cent of capacity.

## Cleveland Builders Have Good Backlogs on Hand

**C**LEVELAND—Most sales offices here report July contracts compared favorably with June. Local producers entered August with good backlog as a result of domestic and foreign new business.

Further indications were provided during the past week that long delayed projects are coming to a head. A manufacturer of business machines placed an order or two for machine tools which had originally come up for consideration in 1935 and had been quoted at least five times since then. Another item of interest during the past week was the sale of some equipment to National Carbon Co. for shipment to India, although first the machine tools will go to the plant here. The Erie Railroad is understood to be inquiring for some small equipment. A number of small companies down state are planning expansion.

## Rock Island Arsenal Inquires for Lathes and Millers

**C**HICAGO—The Rock Island Arsenal is inquiring for 25 milling machines, ranging in size from 12 x 48 in. to 16 x 74 in., and including plain horizontal, universal horizontal and vertical milling machines. In addition, the arsenal is asking bids on 21 lathes, including ten 14-in., four 16-in., and three 20-in. machines. A sales office which a week ago reported

50 per cent higher unit volume than in June this week doubled its last month's unit volume total, making July the best month of 1939 with regard to number of individual sales. In dollar volume, July will rank as the second highest month of the year for this particular concern. Other sales reports from Chicago are not so optimistic, the slump reported by some last week continuing unimproved.

## Rolls-Royce Aircraft Engine To Be Made in Detroit

**D**ETROIT—Those in charge of tooling programs for various General Motors plants have been making every effort in the last week to make arrangements for completion of die work in shops outside Detroit. Prices have been obtained in many cases on the basis of time and materials and in other cases specific quotations have been given. The Detroit transmission plant which will manufacture Buick-Olds transmissions has placed a large volume of gage and fix-

## CAST IRON PIPE

**H**averhill, Mass., has awarded 225 tons of 6 to 12-in. pipe to Warren Foundry & Pipe Corp.

**S**pringfield, Mass., has placed its 1939 pipe requirements with United States Pipe & Foundry Co.

**L**incoln, Mass., has awarded 10,400 ft. of 8-in. pipe with Warren Foundry & Pipe Corp.

**T**reasury Department, Boston, will soon place 8900 ft. of 10-in. and 1750 ft. of 12-in., class 150, pipe for a western Massachusetts flood control and water project.

**R**epublic, Ohio, plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower, pumping machinery and other equipment. Cost about \$78,000. Financing is being arranged through Federal aid. Champe, Finkbeiner & Associates, Nicholas Building, Toledo, Ohio, are consulting engineers.

**W. M. Eagleton**, McElroy Building, Tulsa, Okla., is attorney and representative for new water district now being organized near Tulsa, which will install pipe lines for water system in Berryhill district, including main pipe line for connection with Tulsa system at Forty-first Street and Red Fork limits, which will furnish supply. Project will include a 55,000-gal. elevated steel tank and tower, and other waterworks installation. Allen Craig and Eugene Wood, care of representative noted, are engineers.

**H**azleton, Iowa, plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower, and pumping station. Cost about \$30,000. A special election will be arranged soon to vote bonds for project. Ralph W. Gearhart, 341

ture business within the last week. It is not known definitely whether the business was split between two shops or all of it given to one bidder. This is the last of the automotive work to be released for the year. Buying for manufacture of aircraft engines for the French Government is continuing at the Ford plant with some very definite indications that the machinery will be used in the Lincoln plant at Detroit, not shipped to France as earlier anticipated. This will bring about the manufacture of the English Rolls-Royce aircraft engine on American soil for delivery to France.

## July Was Fairly Active Month in the East

**N**EW YORK—Machine tool sales in July were seasonally above average, and, although the influence of vacation absences was being felt at the end of the month, sales for the period were well up to those of the previous month on the average. For some, July was the more active month, while for others the reverse was true. The outlook for August is fairly promising, with Government and general industrial business to be placed.

Dealers continue to report lengthening of delivery promises as the machine tool builders build up backlog. On large machines, deliveries into March and April, 1940, are being quoted, and even on smaller, standard machines, December is the promise month. This condition is largely a reflection of increasing foreign business, now estimated here as 65 per cent of total bookings. Russia has re-entered the market in recent weeks, the French have become important buyers, while Great Britain continues to hold the lead.

Twenty-first Avenue, S. E., Cedar Rapids, Iowa, is consulting engineer.

**S**chofield, Wis., plans pipe lines for water system and other waterworks installation. Fund of \$200,000 is being arranged for this and sewer system. Foth & Boyd, 310 Pine Street, Green Bay, Wis., are consulting engineers.

**N**ew Straitsville, Ohio, has approved plans for pipe lines for water system and other waterworks installation. Cost about \$60,000. Financing has been arranged through Federal aid.

**G**eneral Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 7 for 4800 lin. ft. of soil pipe, and 3000 lin. ft. of water pipe (Schedule 3521).

**G**oldendale, Wash., is considering bond issue for extensions and improvements in pipe lines for water system, including modernization of waterworks station and other facilities. Cost about \$60,000 with sewer lines.

**H**untington Beach, Cal., is arranging for early purchase of privately-owned water system and installation of new pipe lines for extensions and replacements; also other waterworks installation. An election to approve bonds for \$250,000 for entire project will be scheduled soon.

**G**ilbert Water District, Portland, has awarded 105 tons of 4 and 6-in. pipe to United States Pipe & Foundry Co., San Francisco.

**B**urbank, Cal., has awarded 170 tons of 4, 6 and 8-in. pipe to United States Pipe & Foundry Co., San Francisco.

**V**ista Heights Improvement District, Salem, Ore., has rejected all bids for water distribution system.

**L**os Angeles Department of Water and Power has low bid from United States Pipe & Foundry Co., San Francisco, on 2600 tons of 6 and 8-in. pipe.

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# THE IRON AGE

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# ... THE IRON AGE ...

AUGUST 10, 1939

ESTABLISHED 1855

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## "Must" Is Getting Musty

**O**F all the words in the English language, the little four letter word "must" is the most dangerous and disruptive one.

We encounter that truth early in life. Modern child psychology tells parents to steer clear of the mandatory "must." The boy who is told that he "must" go to Sunday school or that he "must" spend so many minutes or hours on his home work is likely to carry with him through life an aversion to religion or arithmetic.

The same thing is true in the psychology of management. It is said of Alfred P. Sloan, Jr., that he has made it a point never to issue a mandatory order to his executive subordinates. If he thought that a certain principle or policy should be followed, he undertook to "sell" it to his associates through discussion. A sound idea, that, and one that has kept General Motors out of much hot water. For if an idea contains enough good points to be acceptable, it should also be saleable to reasonable and experienced men. If it is not saleable, the chances are that the idea is "not so hot."

Yes, the word "must" is packed full of dynamite and fitted with a percussion cap. It is this simple little four letter word that has blown Mr. Roosevelt's so-called New Deal completely out of water.

It was this eternal succession of must, must, must's, that first soured business on the Corcoran-Cohen combination of Communism and State Socialism that attempted to disguise itself in the inoffensive garb of the Democratic Donkey. But business said: "Take off that ass's skin, we know you."

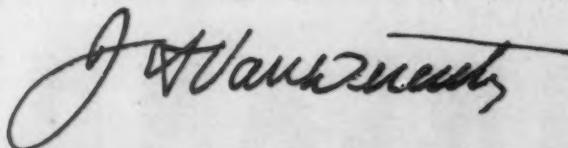
It was this same eternal succession of must, must, must's that has now soured Congress to the point that it has unmistakably said: "We now know you for what you are and are pulling the curtain down on the 20th century, "Comedy of Errors."

It is regrettable that the worthy objectives of recovery, social security and re-employment should have been set back from six to eight years by an amateurish approach. The "must" approach.

You cannot legislate morality. You can "sell" it, if you have the ability and use the methods of Christ or Confucius or Mohammed. None of them ever used the word "must!"

Now that the New Deal nightmare is over, perhaps we can look forward to the day when enlightened management and labor will solve their mutual problems through persuasive and sound salesmanship. That is the only way such problems will be solved.

"Must" is getting musty. Let's put it in the garbage can.



A. J. G.  
SEP 11 1939

# STEEL MAKING IN MINIATURE

## A SPECTACULAR DIORAMA AT THE TIMKEN EXHIBIT, NEW YORK WORLD'S FAIR

We couldn't transplant the world's largest electric steel furnace (capacity, 75 tons per heat) from the Timken steel plant to the New York World's Fair, so we built a miniature reproduction of it.

Models have a fascination for everybody and while this one actually is not capable of producing steel it is perfect in proportion and detail. The miniature train seen in the lower foreground hauls the various alloys etc. needed to manufacture 100 pounds of a standard TIMKEN Alloy Steel.

Apart from the steel display however—of which the above diorama is but a part—the Timken Exhibit contains many other things which will interest and entertain you . . . from its rare beauty of design, color and lighting to the oddities of the Timken museum. The exhibit is located in the Metals Building adjacent to the Trylon and Perisphere.

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A diorama showing in miniature the world's largest electric steel furnace—capacity 75 tons of steel per heat.

A TIMKEN Fuel Injection Pump cut away to show the internal mechanism in operation.

The various parts of a TIMKEN Bearing automatically assembling and disassembling to demonstrate the tapered design and construction of the TIMKEN Bearing.

A display dramatizing the Timken Roller Bearing Company's contribution to modern locomotive design—including TIMKEN Locomotive Bearings, main rods, side rods and other reciprocating parts.

And

THE TIMKEN ROLLER SKATERS in a sensational novelty act performed on a platform only nine feet in diameter elevated seven feet above the floor. The skaters perform ten times daily.

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